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THE HUNGER HOSPITAL IN GUADALAJARA, AN EXPERIMENT IN MEDICAL RELIEF

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In the summer and autumn of 1785 Central Mexico was visited by a series of natural calamities which completely destroyed the grain crop and reduced large sections of the population to a state of extreme poverty and famine. That winter and the spring of 1786 saw thousands of desperate farmers and workmen roaming the countryside, swarming into the towns in search of food, and dying of starvation and disease. The social problems thus created were of a magnitude sufficient to tax the resources of a community far better equipped to solve them than were the municipalities of eighteenth century Mexico. Nevertheless the attempts made, the procedures adopted and the results achieved were such as to render of some value at least a partial account of these events.

Since the "*ano de hambre*," as it came to be known, involved a large territory and directly or indirectly concerned the economy of all Mexico, the documents relating to it are numerous but scattered widely throughout many archives. It is not possible to consider the entire problem here. Attention is rather directed to certain phases

of the situation, as they affected a restricted region, the city of Guadalajara, which may be regarded as the center of the famine area, and where the difficulties attendent upon unemployment and disease were the greatest.[1]

The season was dry in 1785 and a short crop was expected. Then on August 27 a great hail storm swept over Nueva Galicia and parts of Michoacan utterly ruining the corn which had survived the drought. Since there were no adequate stores of grain available, a serious shortage immediately was felt.[2] As might be expected, prices began to rise until in Guadalajara corn had risen from 1 to 5 pesos per *fanega* and wheat from 7 to 18 pesos per *carga*.[3] Since naturally there was no increase in wages, this price differential was sufficient to prevent the peons and the small farmers, as well as the laborers and artisans of the lower wage scale from purchasing food. Furthermore, a general increase in unemployment augmented the number of unfed individuals. The difficulty was thus fundamentally economic. There was no famine of vast extent, such as would cut off all food supply from rich and poor alike. In addition to the rather small reserves in the hands of the wealthy land owning class (sufficient for their own needs) grain could be imported from other parts of Mexico. For example, the nearby province of Colima in 1786 exported 50,000 fanegas of corn [4] to Guadalajara, Guanajuato and elsewhere. Luis Rivera states [5] that there were many victims of the

[1] The documentary sources with respect to Guadalajara are somewhat limited. Of secondary accounts there are none of consequence, the best being a few paragraphs in Luis P. Verdia's *Historia Particular del Estado de Jalisco*, etc." Contemporary information is to be found in the *Gaceta de Mexico* for the period concerned. The most valuable source is the municipal archive of the city itself, from which many important documents were published in 1917 by Luis M. Rivera as volume 1 of the *Seccion Historica de la Gaceta Municipal de Guadalajara* (herein referred to as G. M. G.). In addition, the unbound *legajos* of the archive contain other items not utilized by Rivera (referred to as A. M. G.—Archivo Municipal Guadalajara).

[2] The lack of an adequate reserve was probably due to the small yield of the previous year, 1784 (G. M. G., p. 82).

[3] Verdia, L. P. *Historia de Jalisco*, p. 377. Bustamente (*Supplemento a la Historia de los Tres Siglos de Mexico*, vol. III, p. 57) ascribes this increase of prices to the action of the *hacendados*, "*naturalmente avaros y crueles en la mayor parte*" who hoarded their grain supply and profiteered most flagrantly.

[4] Gaceta de Mexico, vol. 2, No. 19, p. 210. Oct 10, 1786.

[5] G. M. G., p. 82.

epidemics but no citizens of Guadalajara died of starvation. Finally it must be remembered that the average rural Mexican at that time derived his food directly from the land he himself worked and was not accustomed to a wage adequate for the purchase of corn and other staples in the open market. Hence a more or less local complete obliteration of the crops would throw upon the community at large a host of utterly destitute persons. It was the care of this floating mass of humanity, driven out from their homes in search of support which taxed the ingenuity of Guadalajara citizens—a problem which we have seen in our own day on a vaster scale in connection with the " dust bowl " migrants.

In Guadalajara the situation became acute very soon after the hail storm of August, although official activity began only in November. By that time public opinion was aroused and apparently a great deal of discussion was going on. This is reflected in a series of documents wherein certain representative, and doubtless influential citizens were called upon to express their views. Indeed the fact that these suggestions were presented and actually passed on to the governor of Nueva Galicia [6] by the city implies that the constituted authorities were considerably at a loss how to deal with what must have been a very unusual state of affairs.[7] All the witnesses agreed that at the time the chief trouble lay in the influx of unemployed, who thronged the streets by the hundreds, begging and stealing. There were so many cases of open prostitution, robbery, murder and rape that the police were completely unable to cope with them and the lives and property of all the citizens were constantly endangered. The proposals for remedial measures followed lines which were probably even then conventional and which are familiar enough to us today.

[6] G. M. G. doc. No. 114, p. 89.

[7] These private opinions include the following: *Parecer de los vecinos Don Juan Angel Ortiz, Don José de Sanobe, Don Manuel Otero y Don Juan Alfonso Sanchez Leñero respecto a lo que conviene hacer para combatir los males que aquejan a esta Capital,* G. M. G. doc. No. 107; *Parecer de Don Juan Garcia Caro,* G. M. G. doc. No. 108; *Parecer de Don Manuel de Yera,* G. M. G. doc. No. 109; *Opinion de Don Pedro Manual Tapiz y Arteaga,* G. M. G. doc. No. 110; *Informe de Don Juan de Arredondo,* G. M. G. doc. No. 111; *Dictamen de Don Manual Puchal,* G. M. G. doc. No. 112; *Parecer del vecino Don Salvador Gutierrez de Espinosa y Arce* G. M. G. doc. No. 113. All these are dated November 15, 1785.

Don Juan Garcia Caro summed up the predicament tersely by saying that " to deny shelter to the unfortunate vagrants is brutal—to take them in is dangerous." He then suggested excluding all further immigrants and feeding those already inside the city. Citizens Ortiz, Sanobe, Otero and Leñero advocated a public works program whereby the small cotton weaving industry might be expanded to employ an additional 600-700 women and children. This likewise was the solution of Yera and of Tapiz y Arteaga. The former also suggested a housing program whereby the outsiders would construct their own homes on city land. The latter added the idea of starting vegetable gardens, to be cared for by all the indigents, in order to increase the food supply. All these citizens recommended what we now call direct relief in the form of food and shelter as a temporary expedient in general and as a permanent plan for those who were unable to work.

Whether all these plans were adopted or carried out is not clear from the evidence. But it is certain that immediate assistance in the form of food to all and shelter to many was forthcoming. Corn was purchased by the city, and distributed by public agencies, thus providing for large bodies of people through the winter. In November the Ayuntamiento commissioned two citizens to begin buying corn for relief [8] and it is stated that for months subsequently the municipal kitchens fed daily over two thousand persons.[9] All this naturally cost a great deal of money. Indeed a large share of the city business, as indicated by the *Actos de Cabildo* for the period, consisted in raising funds. As always, the Church was the principal charitable agency and through the Bishop of Guadalajara donated large sums. According to Verdia the Ayuntamiento spent at least 150,000 pesos in this way with the Church contributions matching those of the municipality.[10]

Such was in brief the general situation when pestilence appeared and filled to the brim the cup of woe of the unfortunate city. That disease should follow the famine was inevitable, particularly in view

[8] Gaceta de Mexico, vol. 1, No. 51, p. 437. Nov. 22, 1785.

[9] Verdia, p. 378.

[10] During 1785-6 the Church loaned the city government 80,000 pesos for public expenditures (A. M. G. leg. 13, Exp. 1, ff. 82-85).

of the extremely unsanitary state of the city,[11] and the atrocious conditions under which the poorer classes existed.

It is probable that no clear-cut epidemic occurred in the sense of a single specific disease caused by a definite micro-organism. It is more likely that several maladies which were already present in the region became intensified due to the bad sanitation, increased crowding, and extreme malnutrition with consequent lowered resistance. Evidence for this view is of various types. In the first place, there are no data whatever in the contemporary documents indicating the presence, *by name*, of any particular widespread sickness. Such mention would certainly have been made if the epidemic had been one known to the Guadalajara physicians. Secondly, only the poorer social group seems to have been attacked. There is little indication that the more well to do citizens suffered to any great extent, as would have been the case had the epidemic been one of smallpox for example. In the third place, many diseases were already active when the food shortage arose. Thus action was taken by the Ayuntamiento[12] on April 28, 1783, " to combat the epidemic of malignant fevers which attacked the city." There is also a notice from Guadalajara[13] in the *Gaceta de Mexico*, dated April 19, 1785, that is, *before* the crop failure, stating that " the pest is progressing in this city with great rapidity " and that some 80 persons per day were dying. Concerning these troubles the Regent Sanchez Pareja[14] testified, referring to the tribulation and anxiety suffered by the public from " the malignant fevers and pneumonia." He also stated " the municipal physican (*Protomedicato*) Don Mariano de la Torre affirms that the above mentioned fevers are not only epidemic but pestilential." It is quite apparent, therefore, that various illnesses were rampant in Guadalajara when the famine arose and needed only the stimulus of the latter to extend their scope to the proportions of a serious epidemic.

[11] On Oct. 30, 1785 a series of health regulations were promulgated (A. M. G. leg. 13, Exp. 1, ff. 67-69) and again on April 30, 1786 (G. M. G. doc. No. 118). These were directed chiefly toward cleaning up the city, disposing of sewage and garbage, burying corpses, etc. On November 11, 1785 the Cabildo ordered all dogs to be killed and *buried*, because recently eleven dead dogs had been stolen and eaten (A. M. G. leg. 13, ff. 76).

[12] G. M. G. doc. No. 69, p. 56.

[13] Gaceta de Mexico, vol. I, No. 35, p. 281. April 19, 1785.

[14] A. M. G. leg. 11, Exp. 4, ff. 95-96. March 29, 1785.

In the fourth place, there are references to different diseases. Verdia [15] is of the opinion that "it was typhus or some of its derivatives." The following statement (translated) occurs in the Gaceta [16] for June 13, 1786, concerning a special mass celebrated "... because the immediate epidemic has ceased; for although some typhoid cases are still encountered, one cannot speak of them as truly epidemic." On the other hand, prayers were offered [17] for intercession against the "*peste de dolores pleuriticos*" which caused many deaths. Furthermore, there are twice mentioned [18] "*fiebres*" or "*dolores de costado*," which are undoubtedly pneumonia.

Finally we have—of unknown authorship—a description of the symptoms and course of the disease "la bola" most commonly encountered in Guadalajara.[19] This may be translated as follows:

"The malady exhibited the symptoms of constipation or catarrh with a fever low in the morning and high in the evening, severe headache, copious sweating and bleeding at the nose; after the seventh day the skin became splotched with petechias or reddish or purple spots; the patients complained of deafness and the eyes became colored; the belly inflated; consciousness was lost, accompanied by delirium; the lungs shrunk and the patient succumbed from the eleventh to the twenty-first day. In other cases the ordinary symptoms were aggrevated by pain in various parts of the body, principally the chest."

From this description it appears that both gastro-intestinal and respiratory infections were involved. Indeed if health conditions in modern Mexico are a valid criterion it is quite likely that the epidemic complex of 1786 included at least typhoid, dysentery, pneumonia and influenza. The mortality in 1785-6 must have been considerable, although no detailed figures seem to be available. In May, 1786, the death rate in Guadalajara [20] was 100 per day, arguing a total mortality of several thousand. In all Nueva Galicia there were over

[15] Historia de Jaliso, p. 378.
[16] Gaceta de Mexico, vol. 2, No. 11, p. 129.
[17] Gaceta de Mexico, vol. 2, No. 4, p. 44, Feb. 28, 1786.
[18] G. M. G. doc. No. 69, p. 56 and Gaceta de Mexico, vol. 2, No. 33, p. 339, April 24, 1787.
[19] Gaceta de Mexico, vol. 2, No. 33, p. 339.
[20] Gaceta de Mexico, vol. 2, No. 9, p. 111. May 16, 1786.

50,000 deaths according to Verdia.[21] This is probably little more than an estimate but nevertheless may not be too far from the truth.

To cope with the sudden influx of sick and undernourished strangers adequate hospital facilities were necessary. In all the discussions centering around the winter of 1785-6 it was universally conceded that whatever other relief measures might be undertaken it was essential to care for the sick and not permit them to lie in the streets and fields to die. Indeed there was a very acute recognition of the social obligation to these people, however menacing to the welfare of the community might be their invasion of the city. In general, no matter how corrupt and paternalistic may have been the vice-regal government and the economic caste system of colonial New Spain, we must recognize that the ruling class, within its limits, was definitely enlightened insofar as matters of health were concerned. It is not surprising, therefore, that in Guadalajara active steps were immediately taken toward the hospitalization of destitute individuals.

The existing hospital was that of the Bethlehemite order, the "*Hospital de San Juan de Dios y Belen.*" It had been built some time previously [22] and was incapable of accommodating a large number of patients. Conditions were described as being very bad. "It was necessary to place in each ward three rows of beds, and even to occupy some of the cells of the Religious, the rooms allotted to the school, and other quarters; such that the infestation due to the sick corrupted the rest of the place and contributed to the high mortality." [23] Consequently it was decided to open an emergency hospital. For this purpose the old *Colegio de San Juan,* formerly occupied by the Jesuits seemed suitable. The matter was brought before the governor, Don Eusabio Sanchez Pareja, rather informally. He consented to the arrangement, provided the necessary funds could be found. By February 21, 1786 subscriptions from citizens had been secured, amounting to 918 pesos, of which half was to go toward rent and the other half for food.[24]

[21] Historia de Jalisco, p. 379. The population of Guadalajara at the time was less than 20,000.

[22] It was built in 1739 (Archivo General de la Nacion, Ramo Hospitales, vol. 61, Exped. No. 1) and was reconstructed in 1749 (idem. vol. 61, Exped. No. 3).

[23] Gaceta de Mexico, vol. 2, No. 33, pp. 333-4. April 24, 1787.

[24] A. M. G. leg. 13, Exp. 1, pp. 1-19.

The formal authorization of the governor came on April 3 whereby he established "a provisional hospital for needy paupers, beggars, idle vagrants, and foreigners." [25] Thus was launched upon its brief career the "*Hospital llamado del hambre*"—the hunger hospital. Immediately the Ayuntamiento passed a resolution,[26] or enabling act, setting up the hospital, appointing a committee of two to administer it and providing for the purchase of equipment. One perplexing question concerned the distribution of sexes. It was generally held that the women should be kept well separated from the men, an end which was ultimately accomplished [27] by assigning separate buildings, the *masón de las Animas* to the men and the *masón de San Francisco* to the women. The organization was completed by the edict of the Royal Audiencia [28] on April 30 which reaffirmed the previous measures and which stipulated that all vagrants were to be picked up by the police, taken to the new hospital and kept there unless they could show that they had homes to which they could go.

Subsequent to its opening in April there is no documentary information concerning the hospital for several weeks. Presumably the new institution was fulfilling its function adequately. It must have filled up quite rapidly because at the end of the month it contained 240 patients,[29] probably representing its maximum capacity. Nevertheless before long difficulties began to arise, as might well be expected in such a hastily improvised undertaking. These may be considered in some detail since they are quite illustrative of the troubles which are universally prone to attend similar extemporaneous relief measures.

1. *Administration.* The original idea, as mentioned above, was to put the institution in charge of two directors, and evidently this was done immediately. On April 29 notification [30] was given that

[25] A. M. G. leg. 13, Exp. 1, ff. 25-36. April 3, 1786.

[26] A. M. G. leg. 13, Exp. 1, ff. 36-39. April 6, 1786.

[27] A. M. G. leg. 13, Exp. 1, ff. 40. April 22, 1786.

[28] G. M. G. doc. No. 118. *Testimonio del auto proveido por la Real Audiencia y mandado publicar por bando, para contener los efectos de la epidemia* . . . etc. April 30, 1786.

[29] Gaceta de Mexico, vol. 2, No. 9, p. 111. May 16, 1786 (dated at Guadalajara on April 28).

[30] A. M. G. leg. 13, Exp. 1, ff. 43.

the posts had been assigned to Ramon Mateos and Juan Alfonso de Leñero, with full power to act. These men held office throughout the life of the hospital and seem to have served faithfully. Under them were two other officials, an *administrador* who seems to have been charged with the direct supervision of the men's building and a *rectora* who performed the same function for the women. Unfortunately on May 27 the *rectora*, Josepha Murguia, died [31] as did the *administrador*, Don José Troncoso, on June 10. A replacement for Troncoso was requested together with one or two women to take care of the female quarters, supervise the kitchens, prepare the meals, nurse the patients and the like. The salary proposed for the latter position was 15 pesos per month plus double rations. However, either no attempt was made to find substitutes or no qualified persons could be secured, for one month later,[32] July 15, the two directors—who in the meantime had again asked for replacements—were themselves put in active charge of the hospital buildings. Some concession was made by permitting Mateos and Leñero to name two citizens weekly, as assistants for the purpose of administering detail. Nevertheless the hospital was understaffed thenceforward.

2. *Supplies and expenses.* Obviously the maintenance of several hundred patients required large quantities of medicines and surgical material, in addition to the standard hospital equipment and the food which had been provided for by popular subscription. There was an apothecary attached to the hospital, Don Antonio Meto, who made up prescriptions and handled the drugs. He evidently operated for a considerable period on a credit basis, and furnished supplies to the institution likewise on credit. On September 4, 1786 he presented his bill, amounting to some 1099 pesos up to August 31. Mateos and Leñero,[33] in submitting this bill to *Cabildo*, stated that half the amount, 549 pesos, had been paid for by the drug store itself, evidently through sales to the outside public, and the balance had to be charged to the charity fund of the hospital. Since, however, the latter fund was being depleted at a very rapid rate, and since the

[31] Manuel Otero to the Ayuntamiento. A. M. G. leg. 13, Exp. 1, ff. 47, June 10, 1786.

[32] A. M. G. leg. 13, Exp. 1, ff. 48-49.

[33] A. M. G. leg. 13, Exp. 1, ff. 58. September 4, 1786.

profits from general sales were inadequate, he requested that the store be closed to outside patients and its supplies used only for hospital cases. The *Cabildo* replied immediately [34] by asking authorization of the governor to contribute 1000 pesos of its own funds to the hospital and to ease the strain on the apothecary of the provisional hospital by providing free medicine from the stores at the old Hospital San Juan de Belen. Evidently no satisfaction was obtained because the request was repeated in another letter two months later.[35] Since there is no further correspondence on record concerning the matter, it is probable that the hospital was discontinued before the measure could be put in effect. Meanwhile the "*botica*" must have carried on as best it could without aid from the other hospital or the city government.

3. *Medical help.* Throughout the entire course of its existence there seems to have been only one medical member of the hospital staff, Dr. José Rodriguez de Arrellano, who certainly must have been fully occupied in caring for hundreds of patients. Yet this estimable physician received very little compensation for his months of hard and faithful labor. In their letter of September 4, directors Mateos and Leñero asked the *Cabildo* for an extra appropriation of 300 pesos annually to be taken from the hospital funds to pay Dr. Arrellano "whose salary is very small with respect to the number of patients he has to care for." The *Cabildo* agreed with the directors and in their second letter to the governor (that of November 6, which was never answered) they begged for medical help. In particular they requested that "he (the governor) be pleased to compel the physicians of this city to attend the patients in the hospital daily, taking weekly shifts, since the physician who has been doing this has been receiving only 300 pesos [36] a year, which is not enough to pay for his food. . . ." This attempt at compulsory socialization of medicine, however, was a failure, since there is no record of the governor having acceded to the request. Dr. Arrellano presumably continued his onerous duties to the end with no other compensation

[34] A. M. G. leg. 13, Exp. 1, ff. 59-60. September 7, 1786.

[35] A. M. G. leg. 13, Exp. 1, ff. 74, Nov. 6, 1786.

[36] This amount was equivalent in purchasing power to approximately 300 American dollars today.

than his small stipend and the satisfaction of having worthily fulfilled his professional and civic obligations.

4. *Internal troubles.* Perhaps the greatest difficulty encountered by the hospital administrators was the behavior of the inmates. As so frequently happens in such instances these objects of charity showed little appreciation of the efforts made in their behalf. It must be borne in mind, of course, that they represented the lowest stratum of society, not only economically but socially and mentally. Furthermore, toward the end of the epidemic they were not in all cases seriously ill. Actually many of the so-called patients were convalescents who were retained in the hospital simply because there was nothing else to do with them. Idleness and perhaps inferior living conditions contributed to a discontent which manifested itself in many ways. A letter of Mateos and Leñero [87] to the *Cabildo* in the fall of 1786 depicts the situation and gives a striking first hand account of the actual life in the *Hospital de Hambre.* It is therefore quoted in full (translated).

"Gentlemen: Since the creation of the provisional hospitals in this city which you were pleased to recommend to our direction, we have pointed out the various difficulties caused by the grinding of corn and making of *tortillas* in the women's house for themselves and for the men in the other house. In particular, we have noted that the women manifested the greatest repugnance toward the work, that they stole, concealed and even destroyed the dough, in spite of the vigilance of the *administrador, rectora* and assistants. It has cost the latter immense effort and fatigue to force them to grind and bake *tortillas.* On account of the work not having been finished at a correct and reasonable hour breakfast, lunch and supper have been served much later than is proper. Much more corn is used than is necessary. Lately there has been considerable indecent behavior by the women and certain of the men who have been coming from the other house in the daytime to help in making the dough, building the fires, grinding the corn and other tasks of which it seemed appropriate to relieve the women, thus permitting them a lighter load and more rest.

[87] A. M. G. leg. 13, Exp. 1, ff. 63. October 4, 1786.

"Recognizing these abuses we have taken until recently the most appropriate and effectual measures in order to remedy them and have charged the *administrador* and assistants with their strict observance. These persons have, in fact, put these regulations in effect, using kindness and persuasion and redoubling their vigilance and care. Nevertheless in spite of these steps our measures have been fruitless. The same excesses are continuing due to the perversity, malice and fickleness of those people whom it would be best to suppress completely and with less gentleness if the *administrador* and *rectora* possessed the necessary authority to do so.

"In view of all this, and realizing from experience that the only way to cut the root of these evils is to remove the cause which produces them, we have decided that *tortillas* shall be neither made nor eaten in this hospital and that in their place wheat bread shall be distributed, as is done in the hospital at Mexico City. Its cost is only slightly greater than that of the *tortillas*, according to our calculations. . . ."

Shortly thereafter the *Cabildo*[38] approved the action of the directors and decreed that the 200 *fanegas* of corn in the hospital store should be returned to the general warehouse and sold, the proceeds going to the hospital fund.

Toward the end of 1786 it became evident that the provisional hospital had served its purpose and was no longer needed. It was difficult to administer, funds for supplies and medicines were exhausted, the morale was low due to inability to control the inmates, and, most important, the epidemic was practically over.[39] Accordingly steps were taken to dispose of the few remaining patients and close the establishment. The able bodied men were put to work at cleaning the streets, the unattached and indigent women were placed in a women's home, the boys were distributed as servants or apprentices among responsible citizens.[40] The formal end came on January 4, 1787 when the *Cabildo*, in response to a decree of the

[38] A. M. G. leg. 1, Exp. 1, ff. 64. October 7, 1786.

[39] On November 12 or thereabouts a novena was celebrated "because the pestilence is ceasing, and actually at present the mortality is decreasing" (Gaceta de Mexico, vol. 2, No. 23, p. 249).

[40] There were 13 of these *muchachos*.

Audiencia dated December 20, 1786, declared the hospital extinguished.[41] That the sad lesson of 1786 was not lost upon the community is shown by the construction, in 1787, of an entirely new and undoubtedly adequate hospital, munificently donated by the Bishop of Guadalajara, Fr. Antonio Alcalde.[42]

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[41] A. M. G. leg. 1, Exp. 1, ff. 77-79.

[42] An account of the dedication is found in the Gaceta de Mexico, vol. 2, No. 33, pp. 333-4, April 24, 1787.

THE PROGRESS OF IDEAS REGARDING THE CAUSATION AND CONTROL OF INFANT MORTALITY [1]

HENRI SEIBERT

The problem of infant mortality is an ancient one. In 1662 John Graunt demonstrated the relatively high rate of mortality in the earliest years of life in his *Natural and Political Observations Mentioned in a Following Index, and Made upon the Bills of Mortality.* He was the first to utilize the parish records on baptisms, marriages, and burials for the purpose of ascertaining human mortality rates. Today the registration of births and deaths in many parts of the world has made the calculation of mortality rates more accurate than in the days of Captain Graunt, and at the same time has also confirmed his early observation on the high mortality rate of infants.

Historical

Previous to Graunt's record the heavy mortality in infancy had been noticed and commented upon, but there had been no means whereby it could be shown statistically. Hippocrates mentions in his aphorisms (Sect. iii) that " Young people for the most part have a crisis in their complaints, some in forty days, some in seven months, some in seven years, some at the approach of puberty; and such complaints of children as remain, and do not pass away about puberity, or in females about the commencement of menstruation, usually become chronic." (No. 28). Here is emphasis on the fortieth day after birth, and on the seventh month, the next point of intensity not being until the seventh year. As to the causes of these complaints he states (No. 24): " In the different ages the following complaints occur: to little and new-born children, aphthae, vomiting, coughs, sleeplessness, frights, inflammation of the navel, watery discharges from the ears."

Aristotle, in Book vii *On the History of Animals*, writes concern-

[1] From the Department of Biology, School of Hygiene and Public Health, Johns Hopkins University.

ing babies that " the majority of deaths in infancy occur before the child is a week old, hence it is customary to name the child at that age, from a belief that it has now a better chance of survival." He also reported the observation that more males are born with deformities than females, a fact that has since been substantially verified. As to prematurity he states: " children that come into the world before seven months can under no circumstances survive."

Celsus (first century A. D.) in his *De Medicina* copies Hippocrates very closely; the latter's aphorism on the age of the child when it has the most ailments is repeated almost verbatim. He states however, that many ailments of the suckling child can be cured through the internal medication of the nurse, that whatever treatments are given to the nurse will be transferred to the child through the breast milk. This idea held prominence for a long time and is to be found in the literature up to the beginning of the nineteenth century. Soranus (98-117 A. D.) mentions the diseases and care of children, but was more interested in gynecology than in infant welfare.

In Book I of Linacre's translation, Galen (130-200 A. D.) emphasizes that mother's milk is the only natural food for the young, for nature has prepared it and endowed the infant with the faculty to use it. Practically every serious work on the diseases of children devoted a section to the selection of a wet-nurse. Many of these sections are mere repetitions of previous works even though the writers themselves were stoutly against the practice of turning over the new-born to a wet-nurse and were of the opinion that the mother was the person intended to perform that function. However, *les grandes dames* of those days were too preoccupied to bother and perhaps did not really care, and besides the system was so customary that these early writers probably felt obligated to give much space to the proper qualifications of a nurse, for it was held as well known that many diseases and temperaments were transferred from the nurse to the infant.

Avicenna (born 980 A. D.) was perhaps the first to suggest antenatal care. In his *Canticum de Medicina* he devotes a section to the care of the infant while in the uterus. Paragraph 72 (pars secunda) says: " Custodiatur tabiter infans in utero, ne contingat

corpori eius aliquod nocumentum"; and paragraph 73: "Et eligatur nutrix quae cibabit & potabit eum, ut sit boni nutrimenti apud eum."

Still (1931) quotes Pierre Tolet as giving his reasons very clearly for the use of mother's milk. "When you knew not the child nor could see it, when there were no baby's cry, and it was just a weight and a mass in the womb, your very likeness, your child, a human being imploring your help, you refuse, you extinguish what nature has given you without cost. Wherefore, if through fault of the wet-nurse, as often happens, the infant is ruined by almost numberless diseases, do not rail against God in heaven, He does not inflict evil, do not try to exorcise spirits, they sleep in graveyards."

Simon de Vallambert, according to Still, was the first to include syphilis as a disease of children. In his *De la manière de nourrir et gouverner les enfans des leur naissance* he cites a case where the children of a syphilitic goldsmith all had the disease soon after they were born. Tallmadge (1939) points out how Scaevola of Sainte-Marthe in his *Paedotrophia* (1584) describes epilepsy as frequent in new-born because of the humidity of their temperament.

According to Radbill (1938) a certain John Jones, Phisition, the second writer on pediatrics in English, who published his book in 1579, urged the ladies not to use "instruments and trickes of their owne trifeling and toyish invention, as Brasers, Wastes, or bodies, made eyther of paper bordes, plate, or Cardes, ec. to make them slender although by nature they be framed rounde and handsome" . . . "thereby they shorten their children's lives, in hindring as well natures operation by bringing diverse obstructions and infirmities to the parts, but also causeth forth most stinking breathes, copper faces, redde noses, riveled skinne, tawnie colour, and lesse fruitfulness."

Many of the books that appeared around this time are of importance to the subject of pediatrics but of slight concern to the problem of infant mortality. Roesslin's *Rosengarten* appeared in 1512 and Robert Pemell published a treatise on the diseases of children in 1653. An idea may be obtained of the contents of the latter book from the following list:

Of ulcers and sores in childrens heads.
Of lice.
Of the scab and Itch.

Of the falling sicknesse and Convulsion.
Of pain in the ears and inflammation.
Of breeding and coming of teeth.
Of inflammation of the mouth and throat with ulcers and sores thereof.
Of Feavers.
Of small Pox and Measles.
Of watching out of measure and want of rest.
Of fear, starting and terrible Dreams.
Of Rheums, the Cough and shortnesse of breath.
Of Vomiting and weaknesse of the stomach.
Of the consumption or leanesse and of the Rickets.
Of the Hicket.
Of Gripings and fretings of the belly.
Of looseness and flux of the belly.
Of costiveness and stopping of the belly.
Of Worms.
Of Ruptures and Burstings.
Of swelling or coming forth of the Navel.
Of inflammation of the Navel.
Of falling of the Fundament.
Of the Stone and difficulty of making water.
Of Pissing in bed.
Of the disease called Saint Anthonie's fire, or wilde fire, as also of burning and scalding.
Of fretting, chafing or galling of the skin in the groines.

By the eighteenth century it was quite well known that the mortality of infants was entirely out of proportion to that of the rest of the population. Many references are now to be found definitely indicating, with or without figures, that infant mortality is a group problem. After Graunt's publication, vital statistics became established, and it is only from statistics that infant mortality can be discussed, compared, and associated with causal factors.

Following Graunt appeared the works of J. P. Süssmilch (1761), Sir William Petty (1674), and Johann Peter Frank (1780) all of whom showed or mentioned the high mortality rates of infants based on statistical evidence. The latter especially emphasized that infant mortality is a public health problem to be solved by the state.

William Cadogan (1753) used statistical figures indirectly when he wrote: "But let anyone, who would be fully convinced of this Matter, look over the Bills of Mortality; there he may observe, that almost half the Number of those, who fill up the black List, die

under five Years of Age: So that Half the People that come into the World, go out of it again before they become the least Use to it, or themselves. To me, this seems to deserve serious Consideration; and yet I cannot find that any one Man of Sense and publick Spirit has ever attended to it at all." Hurlock (1742), according to Still, used these bills of mortality to demonstrate the fatality of teething in infants.

Jean Charles Desessartz (1760) writes of heavy mortality in infants, which he attributes to the custom of sending infants soon after birth to be suckled by some poor woman. Scarcely one half of these babies lived to come back. According to Still, Zeviani (1775) shows in his tables the high rate of infant deaths also.

Another writer who appreciated the importance of the problem was William Buchan (1769) who wrote: "The annual registers of the dead shew, that at least one half of the children born in Great Britain die under twelve years of age." "It may seem strange that man, notwithstanding his superior reason, should fall so far short of other animals in the management of his young."

"It is really astonishing, that so little attention should in general be paid to the preservation of infant lives! What labour and expence are daily bestowed to prop an old rotten carcase for a few years, while thousands of those, who might be useful in life, perish without being regarded."

George Armstrong (1767) was another Englishman who wrote a treatise on children's diseases. He also complains that "a much greater number of our species in proportion to the whole, than of any other that we know, dies very young . . ." Concerning diseases he writes: "Thus we see their diseases are much fewer in number than those of adults: for excepting what the nurses call inward fits, teething, and the rickets, I do not recollect any particular disorder that infants and children are subject to, which adults are exempted from. For as to convulsions, the thrush, and the watery-gripes, which kill such a number of infants, adults are subject to them as well as they (though I must own not so much) the watery-gripes being only another name for a violent Diarrhea."

"As to convulsions, in which most of the diseases of children terminate before they die, they are so well known to everybody, that

it would be needless to describe them." " . . . in the weekly bills of mortality, convulsions are always said to sweep off a great many children." He believes that this diagnosis is to be found in the ignorance of persons who do not know what other name to give to the disease.

" I come next to TEETHING, which, in the same manner as was observed on convulsions, is said to carry off a much greater number of children than it actually does; for almost all children that die while they are about teeth, are said to die of teething."

Another person to bring the problem of infant mortality to the fore was Hugh Smith, who showed from figures based on the bills of mortality that about two-thirds of the children born die before the age of five, and that 75 percent of these died before two years. A. Hume's book which appeared in 1776, contains the following statements: " Nearly all the children who die within the first year are carried off by convulsions but then these convulsions are the consequence of other disorders which justly demand the utmost attention and care of the mother or nurse who are entrusted with so precious a charge as the life and health of the little innocents." ". . . those convulsions which carry off thousands of infants every year are chiefly owing to the brutality and laziness of nurses who are for ever pouring Godfrey's Cordial down their little throats, which is a strong opiate and in the end as fatal as Arsenic." (Still, 1931).

T. R. Edmonds (1835) believed that the high mortality under one year was due to the excessively high mortality during the first few weeks after birth. He also held that the diminution of the mortality in infants was due to increased population. His argument was that to produce an increase in the size of a population more food was needed for each individual and that since the infants were the ones who benefited to the greatest extent from this increased supply of nourishment their mortality was lessened. Robert Gooch (1835) suggested that, if mother's milk can not be obtained, the child suck a domestic animal, preferably a goat. This writer also laid great importance to the process of teething which he connects with convulsions (after the sixth month), disorders of the brain, and diarrhoea.

In 1837 the civil registrations of births, deaths, and marriages came into operation in Great Britain. William Farr was appointed

Compiler of Abstracts for the General Register Office and in this capacity made innumerable contributions to the study of infant deaths. His tables show the high rates among the illegitimate, among males as compared to females, and in the first month of life. He remarked that: "The first thing to observe is that the fatality children encounter is primarily due to the change in themselves. Thus 1,000,000 children just born are alive, but some of them have been born prematurily; they are feeble; they are unfinished; the molecules and fibres of brain, muscle, bone are loosely strung together; the heart and the blood, on which life depends, have undergone a complete revolution; the lungs are only just called into play. The baby is helpless; for his food and all his wants he depends on others. It is not surprising then that a certain number of infants should die; but in England the actual deaths in the first year of age are 149,493, including premature births, deaths by debility and atrophy; diseases of the nervous system 30,637 and of the respiratory organs 21,995. To convulsions, diarrhea, pneumonia, bronchitis, their deaths are chiefly ascribed; little is positively known; and this implies little more than that the brain and spinal marrow, nerves, muscles, lungs, and bowels fail to execute their functions with the exact rhythm of life."

With the advent of vital statistics the historical chapter may be considered as brought to a close. This does not imply that observations previous to this historical point are valueless, but merely that from that time on the portent and accuracy of the data can be evaluated on the basis of large numbers and comparative figures.

Definitions, Rates, and Present Trends

Infant mortality rates are usually calculated as the number of infants dying under one year of age per 1000 children born alive. The difficulty of getting an accurate census count of the population under one year of age makes it necessary to compute infant mortality rates on the basis of births instead of on the basis of the population exposed to the risk of dying as is done for other specific death rates. Some objections have been raised to this method of computation because of the fact that some children born late in the calendar year will actually die the following year. Rahts (1916) has proposed the following formula to correct for this eventuality:

$$\text{Infant death rate} = 100 \times \frac{d}{0.7L_0 + 0.3L_1}$$

where d = deaths in first year of life of a calendar year

L_0 = number of live births in current year

L_1 = number of live births in previous year.

However, in a fairly stable population, the error incurred in computing the rate on the number of births for the same year will be a constant one unless by some freak of nature there is a sudden large increase or decrease in deaths for a certain year. For comparative purposes the usual method is satisfactory. If, however, more precise rates are desired, it must be remembered that no matter what method is employed, the rates are still dependent on the accuracy of the registrations. Dublin (1917) showed how the infant mortality rate is probably actually greater than that recorded because of incomplete birth registration. Improvements in registrations will increase the denominator and consequently lower the rate.

The most casual observation of the statistics reveals the great decrease in mortality rates during the past two or three decades. In the United States, for the Original Birth Registration Area (exclusive of Rhode Island) the decline has been from 99.6 in 1915 to 49.0 in 1935. Prinzing (1931) has calculated the following rates (per 100 live births):

France	1806-10	18.7	1926-28	9.0
Germany	1872-80	23.4	1926-28	9.6
Sweden	1901-10	19.9	1926-28	6.0
England	1851-60	15.4	1926-28	6.8

For the city of Manila, which has a high death rate for infants, the decline was from 413 in 1911 to 201 in 1920 (Albert, 1922). In New Zealand, which has among the lowest of all rates, the rate was 93.33 in 1880. In 1926 it had dropped to 39.76 (Fraser, 1928). As Hibbs (1916) pointed out, this world-wide decline has been greater than that of the general death rate. But in spite of the decrease the toll is still high and for this reason many painstaking efforts have been, and still are, undertaken by workers in biometry, medicine, and public hygiene to unearth the causes of these deaths.

The present trend has been brought about by an awakening interest in the problem of infant mortality and the dissemination of educational propaganda and medical services to the public by governmental agencies. Ashby (1922) emphasizes the decline in England since 1905 when special attention was paid by the government to the problem. Woodbury (1926) writes: " the causes of the decrease in infant mortality in the United States birth registration area during the period from 1915 to 1921 are to be found in the movement for the protection of the health of infants and doubtless, in the movement for general public health protection and sanitation. The growth within the past few years of public interest in infant welfare work, in child health work, and (recently) in prenatal work for expectant mothers has been noteworthy. Other factors in this decrease . . . are the progress of medical science, the improvement of the technical training of physicians, and the increased number of pediatrists."

Winslow and Holland (1937) find no relationship between the decline in infant mortality and the enforcement of pasteurization of milk, but state that there is a relationship between mortality rates of infants and visits to infant welfare clinics by the infant population. Finizio (1912) showed the beneficial effect of sanitary legislation on infant mortality rates in Italy, and Concetti and Spolverini (1908) believed that hygienic nourishment for the infants was an important factor in their welfare.

The fact that public health measures with respect to infant mortality have ameliorated conditions in a marked manner cannot be denied and certainly no efforts should be spared to continue such measures as have shown success in the past. However, it must be realized that the achievement of a rate below a certain point is, in all probability, impossible. Not only that, but any further considerable reduction of the rate in areas where it is now relatively low is not likely to be realized even with our newly acquired knowledge. Pearl (1921) states that " the easy part of the conflict has happened and is in the past. To continue the good fight with the same relative measure of success, one presently must need know more precisely than is now known the pattern of the causal nexus which controls and determines the rate of infant mortality."

Post-Neonatal Factors Associated with Infant Mortality

The reasons for separating post-neonatal factors from neonatal and prenatal ones will become increasingly clear in the latter part of this discussion. As a whole, post-neonatal factors are strictly environmental and are not the result of any maternal or intra-uterine complications. It will be seen, however, that this division is arbitrary and merely for the sake of easier presentation of the material, for there are many instances of factors that cannot be properly attributed to one of these divisions to the exclusion of the others.

The exact definition of the " neonatal " period is still an unsettled one. In Europe, neonatal deaths usually include only those deaths during the first week of life; sometimes this period is extended to two weeks following birth. In the United States children dying within the first month are usually accepted as neonatal deaths, and unless otherwise expressed, this definition will be understood whenever neonatal is hereafter mentioned.

Social and Economic Environment

That high infant mortality rates are associated with low economic and social standards is an observation that many writers have commented upon. Villermé (1830) remarks on the greater infant mortality in certain quarters of Paris where the people are not so well off than in other quarters. Certain areas of Flanders, especially industrial localities, had higher infant mortality rates than other sections as was shown by Jacquart (1907). Ashby (1922) associated infant mortality with poverty, alcoholism, crowded conditions and work of the mother. Unfortunately, however, this problem is made complex by a multitude of factors that render a true causal analysis difficult. Women in the lower economic classes, who have to work either long hours, or at hard physical labor, will not have the time nor the inclination to care for their children in the proper manner. The work may be of such a nature that the mother receives physical impairment. Simon (quoted from Newman, p. 97) states " That in proportion as adult women were taking part in factory labour or in agriculture the mortality of their infants increased." Newman (1906) comes to the conclusion that (a) character and condition of

work, (b) length of hours, (c) employment before and after childbirth, (d) sanitation of factories and workshops, are factors relating factory occupation of women with high infant mortality.

Woodbury (1924) showed that when the mother worked away from home the rate was 176.1, among those who worked at home it was 114.6, and for those not gainfully employed, 98.0. He also demonstrated that the rate was highest when the father's earnings were lowest. Dublin (1915) shows a higher rate for children of gainfully employed mothers in Fall River than for those not employed. Whitney (1920) found that the mortality rate for infants of mothers who were gainfully employed prior to the birth was 154.5 as contrasted with a rate of 108.8 for infants of mothers not employed. Hughes (1923) in her study demonstrated a decline in the infant mortality rate with a rise in the earnings of the chief breadwinner in the family. The mortality among infants whose mothers were gainfully employed was 107.4 as contrasted with only 77.2 when the mother was not employed, in Haley's (1920) study.

Graves and Fletcher (1935) found that typhoid case rates and infant mortality rates were highest in wards which were obviously slum areas. These two rates, for both white and colored, showed a relation to wards when grouped according to a slum index. Green (1939) in a comprehensive study in Cleveland, found low rates in the higher economic levels, and high rates in the lowest.

The preceding figures merely show that infant mortality is highest in the less favorable social environments. Why this should be so requires further analysis. Ashby showed that miner's infants have a high mortality rate, though miner's wives do not go out to work. Even though the mother does not have to work herself, the fact that she is living in a poor environment still keeps the rates at a high level.

Phelps (1912) has pointed out the complex social and economic factors bearing on the problem which he states have been ignored. With high infant mortality there existed a high proportion of foreign born, high female illiteracy, high birth rate. Extra-domestic employment of the mother is not the dominant factor in determining the infant death rate. He contends that: " The cause of excessive infant mortality in Fall River may be summed up in a sentence as the mother's ignorance of proper feeding, of proper care, and of

the simplest requirements of hygiene. To this other causes must be regarded as secondary." This point was emphasized by a sub-committee investigating the health of Preston. With regard to infant mortality it submitted the following: "But a third and more important cause consists in the very habits of the operative classes themselves, in their ignorance of the first laws of health, and in their blind adherence to customs which have long since been deservedly condemned." (Newman, p. 134). Ausset (1905) came to the same conclusion regarding infant mortality in northern France, and Gaitan (1935) ascribes much of the infant mortality in Guatemala to this same cause.

Forbes (1922), investigating the mortality of infants in Brighton, England, on the basis of the economic standing of the parents concludes that "the chances of survival of the newly born infant are not materially influenced by the social and sanitary conditions under which the mother lives during pregnancy, and, given equally favorable surroundings, the infants of the various classes have equal chances of survival after birth." Greenwood and Brown (1912) were not able "to demonstrate any unambiguous association between poverty . . . and the death rate of infants." Mitra (1937) no longer considers infant mortality as a sensitive measure of unfavorable social conditions. He finds it no longer correlated with fertility, the number of older children to the wives, or with the proportions of men occupied in professional or low-grade work. It is, however, still associated with overcrowding, especially the mortality from the second to twelfth months.

Bellows and Reed (1934) employed an adequate statistical method for estimating the influence of external factors upon infant mortality rates. The factors studied were temperature, latitude, number of foreign-born in the population, the number of colored in the population, and the number of persons employed in mining and manufacture. The rates ranged from 56.60 (Seattle) to 134.75 (Lowell), but after correcting for all five factors, the variability was reduced only 28 percent, showing that other factors were still importantly concerned. The correction for percentage of population employed in mining and manufacture reduced the variability more than the other factors.

All of these findings, boiled down to a few words, suggest that the risk of dying soon after birth is only slightly affected by the social standing of the family. As the infant becomes older, it becomes more susceptible to the unfavorable environment and consequently the risk becomes greater. Green (1939) has shown that the greatest variations from economic level to economic level were evident in the rates of infants in the last 11 months of the first year of life.

Illegitimacy

Illegitimacy is always associated with a higher infant mortality rate. Westergaard (1901) has shown this in both breast fed and artificially fed groups. Using the method of expected rates, he concluded that some other factor besides the type of feeding must be responsible for the differences. Pearl (1906) calculated the mean duration of life of legitimate and illegitimate infants and found that legitimate males had an average excess of 14.59 days and legitimate females of 13.96 days. Illegitimacy is associated with low social conditions and lack of proper maternal care. This simple explanation does not account, however, for the greater incidence of neonatal deaths in unmarried mothers; this topic will be resumed in the section of neonatal deaths.

Temperature

The influence of temperature on infant mortality attracted the attention of many of the early students of the problem. In many cases they alleged a direct effect of heat or cold on the infant. Villermé and Milne-Edwards (1829) laid stress on the fact that there was a higher infant mortality during the winter months, and in the northern provinces of France. Temperature was held to be a direct cause of these deaths because the young (from 0 to 3 months) infants produce less heat and consequently cannot resist the influence of cold. On the other hand Lyndes (1882) took the opposite point of view and claimed that the intense solar heat has a deleterious effect as evidenced in the high mortality rates for the hot months of July, August and September. Even later writers as Meinert (1906) and Rosenfeld (1910) show an association between infant mortality and temperature, although they are a little more cautious in attributing

this relationship to direct effects of the temperature. It is now an established fact that there is a seasonable variation in mortality rates, but the reasoning of these early writers is now known to have been erroneous. The seasonal changes in mortality are not due to the temperature as they believed, but to the greater prevalence of certain diseases during the different seasons.

Nationality and Race

Dublin (1915) found a higher infant mortality rate among the offspring of mothers in Fall River, Massachusetts, who were born in foreign countries than for the native born. Eastman (1919) pointed out that although the native element of the population of New York state has a lower infant mortality rate from *all* causes than the foreign element, the native population shows much higher rates from prenatal causes. Other noticeable features are the high death rate of Italian infants from respiratory diseases; excessive mortality of Russian, Polish and Austro-Hungarian infants from gastro-intestinal disorders; and the exceptionally large numbers of deaths of Canadians due to prenatal causes. Haley (1920) found a high infant death rate for the foreign born in Akron, Ohio, especially high for children of Slavic and Italian mothers. Hughes (1923), for Gary, Indiana, found the rate among the babies of Polish mothers to be in excess of that of other nationalities. Whitney (1920) in New Bedford, Massachusetts, found the highest infant mortality rate to be that of the Portuguese white. Polish and French-Canadian mothers had the next highest infant death rates. De Porte (1925) showed that in the United States Registration Area, children born to mothers of Scandinavian origin had the lowest death rate, with Russians and native born next. Those born of Austrian, Canadian, Polish, and Negro mothers had the highest. Sterling's (1927) work on the U. S. Birth Registration Area for 1927 confirmed De Porte's work. Woodbury (1925) and Ashby (1922) have pointed out the low rates for children of Jewish mothers. Prinzing (1931) gave the following rates (per 100 children born alive) for the city of Amsterdam:

	Protestant	Catholic	Jewish
1905-1910	8.8	10.3	7.3
1911-1920	5.5	7.0	5.1

The low rate for Russian infants is probably due in great part to the fact that most of these immigrants were Jewish.

Pearl (1921) found for cities over 25,000, for cities under 25,000, and for rural counties that the infant mortality rate for Negroes was about twice that of the whites. Stoughton and Gover (1929) show a higher rate for Negroes over whites for the cities of Richmond, Baltimore, Washington, Charleston, and New Orleans, for the northern states of Indiana, Michigan, New York, Ohio, Pennsylvania, and Maryland, and for the southern states of Kentucky, North Carolina and Virginia. The difference was most marked in urban areas of the south. The ratio of colored to white deaths was greatest during the fifth to tenth month of life. Rates for both races were high in the first months, and while the colored infants had a greater incidence of respiratory, tubercular, and gastro-intestinal diseases, the causes of death from prematurity and congenital debility were practically the same for both. This suggests that the racial factor from a biological point of view may not be as important as the figures indicate. Fundamentally the races are closer together as far as their ability to produce healthy offspring is concerned, but the later life of the infant, the time when it is mostly under the influence of its environment, is the period when apparent racial differences become manifest. The different customs of the people, many of them brought over from the home country, begin to play an important role on the survival of the child after it has passed the neonatal period. However Levy (1922) on basis of figures for New Jersey, which show a lower neonatal mortality among foreign born, claims that in spite of supposed general ignorance and lack of hygiene of foreign speaking groups, that there are some conditions counterbalancing these so-called unfavorable circumstances. These conditions are: (1) large number of multipara (marry earlier and interfere less with natural processes of birth), (2) lower incidence of gonorrhea and syphilis, (3) more highly developed maternal instinct, leading to more mothering and maternal nursing. De Porte (1925) showed that the differences in rates are due primarily to differences in the mortality from digestive and respiratory diseases. He points out further that there has been little change in the rates of mortality of infants under one month. The small differences that are apparent, however, are due to causes

"as yet little understood" and those rates very probably have a biological basis. Eastman (1919) believed that fewer deaths from prematurity and congenital defect among children of Italian, Russian, Polish, and Austro-Hungarian parents in New York City may be attributable in part to "the greater vitality and superior constitution of these infants." Seiffert and Oettl (1927) held that mortality variations cannot be wholly accounted for by differences in economic conditions, care of children, frequency of births, or other causes dependent on environmental conditions. The mortality of foreign-born mothers in the United States parallel roughly the mortality of the same stocks in the country of birth so that the influence of social heredity probably is of considerable importance along with other factors.

There is little doubt that racial differences, as indicated by nationality, do influence infant mortality but the precise manner in which this relationship is brought about is certainly not clear. Type of feeding, economic status, etc., can possibly account for the differential rates in the older infants, but for an explanation of race differentials in neonatal death rates new factors will have to be brought to light. A study by Ford (1927) has made a beginning at unearthing some of the basic differences between the racial stocks with respect to infant mortality. It was found that combined stillbirth and neonatal mortality rates are doubled in mothers with visual disturbances or edema and are increased five-fold in mothers with more than a trace of albumin in the urine. Premature birth rates are twice as high under the first two conditions, while larger amounts of albumin, or albumin combined with high blood pressure, are associated with premature birth rates almost seven times the normal rate. Among native white mothers there was a high incidence of contracted pelves and of albuminuria and high blood pressure. There was a high incidence of syphilis and contracted pelves among Negro mothers and a high incidence of contracted pelves and albuminuria and high blood pressure among Irish mothers. On the other hand, there was a low incidence of contracted pelves and albuminuria and high blood pressure among Italian and Russian mothers. The neonatal death rates for these races in the U. S. B. R. A. for 1920 were 38 for Negroes, 35.8

for Irish mothers, 32.6 for native-born, 25.7 for Russian, and 24.7 for Italian. Riggs (1904) found a higher percentage of vertex presentations and spontaneous labor among the Negroes than among the whites. Peckham (1932b) found that blacks had a longer duration of labor than white mothers, irrespective of age and parity. Furthermore this fact was not found to be due to a higher incidence of contracted pelves among the blacks. The same author (1932a) found that the fetal mortality in blacks increased proportionately with duration of labor after 12 hours, but in whites only after 24 hours. That such racial differences exist is questioned, however, by others who maintain that so many social, economic, and other environmental complexities are bound up with this problem that they all cannot be possibly corrected for. Even though it appears substantially proven that certain obstetrical abnormalities are more prevalent in certain races than in others, nevertheless these conditions are not sufficiently common to account for the racial differences that appear in the statistics of large populations.

Feeding

The method of feeding the infant has received considerable attention since this factor is, in a sense, a controllable one. Far back in the literature of infant care there are many references to the proper food for infants. In most cases the use of breast milk was advocated in preference to artificial or "dry" feeding. Caulfield (1931) has realistically depicted the filthy conditions under which milk was distributed in the eighteenth century; he goes on the state that it is no wonder that artificial feeding was attended by a prohibitive mortality. However today, even with the modern sanitary conditions of milk production, there are many data to support the contention that breast feeding is far superior to artificial feeding as far as the survival of the infant is concerned. Böckh (1887) showed the beneficial effects of breast milk on infant mortality rates for all months of the first year over artificial and other types of nourishment. Woodbury (1922) found an excess mortality of artificially fed to breast fed, even after making allowances for such factors as race and nationality. Excess mortality among infants artificially fed is greatest from gastric and intestinal diseases connected with improper feeding. Dublin

(1915) says " beginning with the second week of life, infant feeding is clearly the chief factor in the mortality." He gives the following figures:

Infant mortality with different mode of feeding at time stated

	2nd week	2nd month	4th month	7th month	10th month
Breast	131.0	101.2	64.2	48.9	20.9
Artificial	421.1	304.8	123.6	97.6	28.2

These figures clearly show that those babies started early on artificial feeding were more handicapped than those who were breast fed. The earlier artificial feeding was instituted, the greater the difference in the rates.

Newman (1906, p. 226) quotes Hope to the effect that " Irish infantile mortality is much less than the English because Irish mothers suckle their infants much more commonly than English mothers." Haley (1920), Whitney (1920), and Hughes (1923) in their epidemiological studies of infant mortality all found that the artificially fed infants had a mortality rate four to five times that of the exclusively breast fed. Sedgwick and Fleischner (1921) attribute the great decline in infant mortality in the city of Minneapolis to a campaign that directed its efforts to increasing breast feeding among mothers.

While the mother's milk has been shown to be far superior to other diets for infants, merely putting the child to the breast is not a guarantee that it will be properly nourished. As McCollum (1922) pointed out, breast milk is not a satisfactory food unless the diet of the mother is good. At the same time that mothers are urged to suckle their young, they must also be urged to provide themselves with the proper foods.

A propos to the subject of feeding, Westergaard suggested: " Die künstliche Ernährung kann durch die schwache Konstitution der Mutter bedingt sein, in welchem Falle die grosse Sterblichkeit teilweise als erbliche Belastung zu erklären wäre." It is not improbable that mothers with weak constitutions would tend to resort to artificial feeding and thereby increase the mortality of their offspring.

Diseases

The most prevalent diseases of later infancy and those with the greatest fatality are those of the gastro-intestinal and respiratory systems. Prinzing gives the following rates for causes of death of infants in Germany:

Lebensschwäche	36.2
Infektionskrankh.	9.0
Tuberkulose	1.1
Lungenentzündung	12.3
And. Krankh. der Atmungsorg.	4.1
Krankh. der Verdauungsorg.	15.5
Krankh. der Kreislauforg.	1.9
Krankh. des Nervensystem	6.2
And. benannte Krankh.	13.8
Unbekannte Ursachen	1.3

In the United States, as given in the infant mortality statistics for 1935, the most prevalent cause of infant deaths (excluding prematurity) was bronchitis and bronchopneumonia, followed by diarrhoea and enteritis.

Richards (1903) believed that fatal infantile diarrhoea was a form of food poisoning with infections taking place at home and in polluted soils. Budin (1902) showed an association between gastro-intestinal diseases and artificial feeding. Tatham (Newman, p. 53) stated that " increased mortality from diarrhoeal diseases is probably attributable in great part to the prevalence of artificial feeding, and this now appears to be consistent with the fact that the increase has been greater in urban than in rural counties." Woodbury (1925) likewise showed the great differences in mortality of breast and artificially fed babies with respect to gastric and intestinal diseases. He also stated that such diseases are more prevalent during the summer months, while pneumonia and other respiratory diseases occur more often in the winter.

Aside from these acquired diseases which take their toll in later life, there are some, such as syphilis, where the infection occurs before birth, but the symptoms are slow in appearing. These congenitally acquired disorders will be more fully discussed in the section devoted to diseases of earliest infancy.

Prenatal and Neonatal Factors Associated with Infant Mortality

The secular decline in infant mortality rates mentioned earlier in this paper has not held true for all ages. Neonatal deaths have remained practically unaltered in spite of improved medical aid. Edmonds (1835) was one of the first to indicate that high mortality under one year was mainly due to excessively high mortality during the first few weeks after birth. As demonstrated by Newsholme (1924), Rice, Barnard, Duffield, and Blumenthal (1937), and Adair and Potter (1936) the decline of mortality in the neonatal period has been slight as compared to the later periods of life. In fact, it was pointed out by Hoffa (cf. Peller, 1936) in 1914 and Schlossman (1927) that in some instances these rates have actually increased, especially the death rates soon after birth.

The general downward trend of infant mortality has been due to bettering the environment of the child and protecting it against those diseases to which it is particularly susceptible in later life. Green (1927) contended that the reduction in infant mortality for the past generation has been practically all due to the decrease in deaths from diarrhoea and enteritis. Albert (1922), in the Philippines, laid stress on the reduction in deaths from tetanus and beri-beri, two diseases which are prevalent in Manila and which annually carry off large numbers of children. But the essential point is that with all known means of control and prevention in full operation it still remains the fact that the neonatal mortality of the first few weeks of life remains unaltered, exhibiting no significant decline.

In recent years the problem of these neonatal deaths has attracted more attention than infant mortality as a whole. The diagnosis of the diseases and causes of death in earliest infancy is difficult and dependent on the newer pathological techniques at autopsy which were not generally developed until the present century. The newer sciences of endocrinology, genetics, and constitution, have also given workers incentive to study whether there may be any useful relationship between these subjects and the still baffling problem of the causes of death in earliest infancy.

Maternal Factors During Pregnancy

Nourishment and Prenatal Care

The effects of diet, poisons, alcohol, tobacco, etc., on the mother and her offspring have attracted the attention of many men and loaded the literature with considerable excess verbiage. Delaunay (1880) stated that tobacco is bad for woman and child and that it provokes faulty deliveries in pregnant women. This statement was followed up by Thévenot (1880) who showed that infant deaths were greater when the mother resumed her work in the tobacco factory, after a temporary absence for her delivery, because of the fact that she gave her child nicotinized milk. The former writer did not believe that bad living conditions of these factory workers caused the heavy mortality because it has been shown that they are relatively better off than most workers. The conclusions of these discussions were overthrown by Piasecki (1881) who, after an exhaustive study of the subject, concluded that: working in a tobacco factory had no influence on menstruation; that faulty deliveries were no more prevalent among these women than among others; that the pregnant state of the women was not affected adversely. While mortality of the newborn was considerable (223 out of 376 births) other causes must be sought, as unfavorable environmental conditions, bad nourishment.

Paul (1861) showed that in 141 pregnancies lead poisoning was the cause of 82 abortions, 4 premature deliveries, 5 stillbirths, 20 children dying within the first year, 8 within the second, and 7 in the third. Only 10 passed the third year out of the original 141 pregnancies.

Improper diets of the mother are known to have a deleterious effect on the baby, before and after birth. Prochownick (1901) stated that the nutrition of the mother influences the weight of the offspring, and Paton (1903) that the size of the offspring depends very directly upon the diet and nutrition of the mother during pregnancy, which, he claims, helped to explain the high mortality among the poor. Attempts have been made to control the size of the baby by a restricted diet and a certain degree of success was obtained by Friedman (1926). There was a slight but definite decrease in the

weight of babies at birth of patients who were not permitted to gain over one half a pound per week from the twelfth to the fortieth week of pregnancy. This experiment was undertaken to reduce the likelihood of birth injuries and post-partum hemorrhage. However, there is much conflicting opinion on this topic. Many do not agree that limitation of food intake by the pregnant mother has any effect in reducing the size of the foetus. Toombs (1931) showed that in 39.2 percent of the cases studied the baby weighed 7 pounds or more when the mother had gained less than 20 pounds, and in only 18.8 percent of the cases did the baby weigh less than 7 pounds. When the mother had gained more than 20 pounds, the baby weighed 7 pounds or more in 29.6 percent of the cases, and less than 7 pounds in 12.4 percent. There is still much controversy as to whether the foetus grows at the mothers's expense or whether an undernourished mother affects the growth adversely. The works of Bluhm (1929), Jonen (1932) and Meier (1933) give references to the literature on this topic.

Maurer and Tsai (1932) experimenting with rats, found a high infant mortality rate among offspring of mother rats receiving a diet adequate for normal maintenance of a non-pregnant rat. A rat, during gestation, receiving only sufficient vitamin B complex for maintenance when not pregnant, suffered a dystocia. These writers further state that during the months of December, January, February, March, April, May, and June, the human diet receives less than the optimum maintenance of vitamin B complex. All statistics show higher infant mortality rate during those periods than in the months of August, September, October, and November.

Balfour and Talpade's (1932) work in India showed a rate of prematurity in southern India of 100 per 1000 as compared to 37 per 1000 in northern areas of that country. In the latter regions a variety of food is available, but in the south the diet consists mostly of rice. In Bombay a survey showed that the calories and vitamins of women with normal delivery (i. e. mature) was higher than for women with premature children. Another approach to the problem was made by Williams (1936) who showed that the relation between maternal death rate and infant death rate is striking when taken not in the same year but in successive years. He concludes that nutrition of the mother plays a leading role rather than other environmental conditions.

That other methods of prenatal care are important aside from the nutrition of the mother has been shown by Peller (1923). He contends that rest for the mother, in a proper institution where she may receive the benefits of proper care and advice, is of great importance to insure a healthy and normal child. This care, starting at least seven days before delivery, had a significant effect on the decrease of stillbirths and neonatal death rates in Vienna, irrespective of age of mother, marital status, parity, and multiple pregnancies. A rest period of only one to seven days had no apparent effect. The same worker (1929) found similar results in Palestine, although the differences were not so marked there because of the fact that the mothers, before delivery, did not stay in the hospital as long (only 14 days) as those in Vienna did. The environment controlled the rates insofar as they affected the mother through lack of proper nourishment. Unmarried mothers with proper care had offspring with a better weight/length^3 ratio than married mothers without the same care, i. e., prenatal attention and rest. In spite of great differences in weight and length between male and female infants, and between first and second born infants (which are purely biological differences) these differences were less than those found between children of mothers who had been cared for before delivery and those who had not. (Peller, 1913.)

Prenatal care may thus be divided into medical and social care. In the first instance the mother is dieted, examined, given therapeutic treatments, etc., and in the latter case, she is taken out of the home, away from all responsibilities, worry, and work, and given complete relaxation until delivery. The combination of these two is apparently of great importance in any attempt to reduce the neonatal death rate.

Illegitimacy

It was previously pointed out that unmarried mothers had a higher infant mortality rate than married. The post-neonatal mortality is no doubt due to the unfavorable circumstances which unmarried mothers are usually subjected to in most countries; or arguing from the other angle, the lower economic and social levels are the habitats of most of these unfortunate women and the offspring are brought up in these unfavorable surroundings. But the fact that there is

also a higher neonatal mortality among the illegitimate indicates that there are ante-natal factors in operation. Schultze (1938) showed that the birth weight of the married women's offspring was 3,304 grams compared to 3,153 grams for the unmarried. Stillbirths among the unmarried mothers were a result mostly of prematurity. He also associates various gynecological and obstetrical conditions with marital status. Eclampsia and bursting of the amniotic sac are more prevalent in married women presumably associated with coitus in the pregnant state. In unmarried women he found a greater frequency of transverse presentations and rupture of perineum. Pearl (1939) however, has pointed out that coitus in the pregnant state, even to a few hours before delivery, has no apparent deleterious effect.

Whether Schultze's conditions are significant is hard to judge, but the apparent debility of offspring of unmarried mothers can be associated with their inferior prenatal care. As Peller showed, illegitimate children were healthier than legitimate when the mother was well taken care of.

Multiple Births

The mortality rate is greater among plural births than for single births as shown by Prinzing (1931), Whitney (1920), Hughes (1923), Woodbury (1925). The mortality in these cases is three or four times as great as that of single births. Hirst (1939) showed that maternal, still-birth, and neonatal death rates from twin pregnancies increased roughly about three times over those of single births. Peller (1930) found a much greater mortality in the neonatal period (within the first week). Goehlert (1879) found that of 410 twins, 112 (27.3 percent) died in the first month, 214 (52.9 percent) in the first year. Like twins had the heavier mortality for the first year of life. Bundesen, Fishbein, Dahms, Potter, and Volke (1938) believe that the large contribution to neonatal mortality made by twins and triplets is not because of any particular condition associated with twins or triplets *per se*, but because of the high incidence of prematurity among multiple pregnancies.

Prematurity

Prematurity may be considered an *ante partum* factor of infant

mortality because there is some evidence to indicate that with prenatal care and rest, a mother's chance of having a premature delivery is lessened. There are, however, some instances of pregnancies terminating before term for no accountable reasons. But generally, the period of gestation may be prolonged until the correct time for its termination by adequate pre-natal care.

The official U. S. A. figures for 1935 show that 15.4 infants per 1000 born alive die as a result of premature birth. This rate marked the highest single cause of infant death. Prematurity is not a rarity as the figures of Schwarz and Kohn (1921) show. In 11,000 infants born at home, nearly three percent were premature. Prematurity in this case was defined as any infant weighing less than 2500 grams at birth. Murphy and Bowman (1932) found 238 premature births in 2876 consecutive labors, eighty per cent of these premature births being spontaneous and twenty per cent induced. Swanson, Turner, and Adair's (1935) experience shows that of 9,775 consecutive live births, 664 were premature of whom 127 died (19.13 percent). The total mortality for the premature infants accounted for 63.2 percent of the 201 deaths. Tyson (1939) found prematurity as a cause of death in 26.2 percent of the stillbirths and 34.0 percent of the neonatal deaths. Of 579 premature infants prematurity was the only cause of death in 278 cases. Adair and Potter (1936) found that in 32 percent of neonatal deaths (2 weeks) premature delivery was apparently the only cause for failure to survive. Murphy and Bowman found that of all spontaneous premature labors the cause of 58 percent of these could be determined. Disease or abnormality of the uterus, its contents or appendages was responsible for 73 percent of the known causes, but no cause for prematurity could be found in approximately 42 percent of the spontaneous births. Heidler (1928) found a mortality of 23.56 among the immature as compared to only 3.04 for the full term. Sterling (1933) found that the neonatal death rate for children of Indian women was in great part influenced by the incidence of prematurity, but she feels sure that if autopsies had been performed the cause of death would have been altered. Bundesen, Fishbein, Dahms, and Potter (1937) point out that the majority of death certificates do not contain the true cause of death. Careful necropsies revealed cerebral hemorrhage, congenital malformation, pneumonia, and asphyxia, as the leading causes of death,

but that prematurity is usually given as the cause of death when no autopsy is performed. Tyson (1929) compared clinical and autopsy records as to the cause of death and found that there were great differences in the diagnoses. Consequently the high rate given in the official returns cannot be unreservedly accepted as dependable since these figures are based on what the attending physcian filled out on the death certificate.

Duyzings (1935) showed how the survivorship of premature babies increases with their birth weights:

Birth weight	Percentage survival
500-1000 grams	0.0
1000-1500 "	6.2
1500-2000 "	24.9
2000-2500 "	47.1
2500-3000 "	58.8
3000+ "	52.7

Peckham (1938a and 1938b) in a series of studies on prematurity found that early childbearing does not increase the incidence of true prematurity, but that young women give birth to infants smaller in weight but equal in length to that of more mature individuals. With increase in weight and length there was a decreasing stillbirth and neonatal mortality. Mortality rates among the premature increased with the advancing age of the mother and with increasing parity. He suggests that the definition of the term be corrected for the race, age, and parity of the mother and the sex of the infant since a blanket definition of prematurity is not applicable to all cases.

The problem of prematurity is still unsolved. One reads in Newman: " This striking fact then, that 30 per cent of all infant deaths in this country are due to immaturity, would seem to require explanation. It is evident that if infants die within a few days or hours of birth or even if dying later, show unmistakable signs of being unequal to the calls of bare physical existence, that there must be something more than external conditions or food management which is working to their hurt. The explanation is clearly to be found in ante-natal conditions." This statement is still substantially correct. A few other ideas have been interjected but nothing has

been definitely proved. Balfour (1930) wrote that the incidence of feeble and premature births in India is much higher than in England and is a marked cause of the higher infant mortality. She went on to say that there is evidently some antenatal factor leading to weakness either of the germ cells, or of the developing foetus, or of both, which possibly may be connected with a maternal or paternal dietary deficiency. That the premature infant has not had a chance to properly develop its breathing apparatus for a new existence has been suggested by Peiper (1929), and Peller (1936).

Maternal Factors During Delivery

Age of Mother

Numerous studies indicate that the risk of dying before reaching the age of one may be associated with the mother's age. Dublin (1915) found that the mortality rate increased with age of the mother, the lowest rate occurring in infants of mothers 20 or under. He stated, however, that this low rate for young mothers is hardly trustworthy in view of the small number of cases under observation for that age group. Haley (1920) reached a contrary conclusion: " an analysis of births and infant deaths by age of mother shows that the infants of the youngest mothers had the highest mortality. The rate for infants of mothers under twenty was 108.1, as contrasted with 83.7 for all mothers over 20. The rate was also high for mothers from 30 to 34." Whitney (1920) found the infant mortality rate for infants of mothers aged 25 to 29 to be the lowest. Infants of mothers under twenty had the extremely high rate of 259.3. Woodbury (1925) and Hughes (1923) found that babies born to mothers under 20 or to women 40 years or over had the highest infant death rate. Babies born to mothers in the twenties had the best likelihood of living twelve months. Peckham (1932b) found that duration of labor increased with advancing age of the mother, more so in Negroes than in whites, but when spontaneous delivery alone was investigated, there was a decrease in duration for whites, but not for Negroes.

The interesting results of Yerushalmy (1938) not only found the neonatal mortality of infant deaths in the first month of life,

born to very young mothers and to older mothers to be higher than that of infants born to mothers 20-30 years of age, but also that the neonatal mortality was associated with the age of the father. The rate was highest for young fathers, low for fathers of 25 to 29 years, and rose thereafter. A more recent paper (1939) by the same writer shows that the late fetal and neonatal mortality rates for full term births are high for young and old parents and low for the intermediate ages except that the rates for young fathers are relatively low. This relationship was found to be independent of any correlation between the ages of the two parents.

Parity

Closely correlated with age of mother is parity. The U-shaped distribution of infant deaths with age of mother is in great part, therefore, attributable to this variable. But Yerushalmy's work indicates that there is something more to the risk of dying than just the number of children borne by the mother. There may be an association between this typical distribution of infant deaths and the declining fertility of both sexes with advancing age. (Cf. Pearl, 1936, and Yerushalmy, 1939.)

One would naturally expect that the more births a woman has the greater the chances for the child to be weakened because of the breakdown, or at least the wearing out of the reproductive system. As has been shown by Westergaard (1901), Woodbury (1925), Yerushalmy (1938) and others, the mortality rate for the first born infants is higher than for the second born, but rises gradually thereafter with parity. Bundesen, Fishbein, Dahms, Potter, and Volke (1938) have shown that children of primiparae undergo a greater hazard during the first two weeks of life with or without complications of pregnancy and labor, or with both, than the children of multiparae. Pearson (1914) shows that first born have greater prevalence of insanity, epilepsy, tuberculosis, and albinism; that the first born have less weight and are shorter; and that mortality increases with the first born.

Primiparae usually have a higher incidence of dystocia, especially if the first birth occurs later in life, say around 35 or older. The elastic tissue cells and muscle cells of the uterus and birth canal are

replaced by less easily stretched connective tissue cells. Nathanson (1935) compared the first labor of women twenty years old and younger to the first labors of women 35 and older and found the average difference in duration of labor to be 4 hours and 33 minutes. Tscherne (1938) gives the following figures. Of 994 children of old primiparae 109 died during birth or in the first week. With increasing age of mother, infant mortality increased:

30-35 years — 10.17
35-40 years — 11.2
40 + years — 20.3

But even for young primiparae, first births are handicapped by a higher mortality from causes peculiar to early infancy, according to Woodbury (1925). Complications of pregnancy are more or less connected with parity as Peckham's (1933) paper indicates. Transverse presentations are rarely known in the primipara but become increasingly common with rising parity. Eclampsia is a disease of primiparity, nephritis increases with multiparity. Total toxemias are high among primiparae, low for the 2-para, and increase thereafter until 8-para when the rate becomes higher than in the primipara. Placenta previa is a complication of multiparity. Premature separation of the placenta increases only after the 8-para group. Post-partum hemorrhage is higher among primiparae. Pyelitis decreases with increasing parity; puerperal infections are most frequent in primiparae, then decline to the 5-para after which the rate rises somewhat. Operative delivery is more common in primipara and rarest among the 4- and 5-paras, becoming increasingly common thereafter as parity rises. Duration of labor is longer in the primiparae, but there is no association of higher parities. It seems that these various complications of pregnancy follow the same trend as the mortality rates; that is, that the primiparae have a greater chance of having a complicated delivery, after which the incidence of complications drops and then begins to rise gradually with increasing number of children. Wachenfeldt (1935) showed that length of delivery is shortest for the 2-3-parae and rises thereafter. While transverse presentations increase with rising parity, cerebral presentations decrease. Placenta previa, placenta marginata and placenta

circumvallata as well as premature separation of the placenta increase. Perineal ruptures, operational deliveries, puerperal infections fall with parity, but atonic bleeding in the afterbirth rises. Mortality of children rises with increasing parity.

At this point it is interesting to compare Issmer's (1889) tables on the duration of gestation with age and parity of the mother.

Age of mother	Days	Parity	Days
15-20	275.8	1	276.78
21-25	278.6	2	278.9
26-30	280.0	3	281.3
31-35	280.2	4	278.1
36-40	275.0	5	276.9
41+	274.6	many	281.4

The trend of length of gestation follows closely those discussed above for both age and parity. Solomons (1934) has pointed out that multiparity is also dangerous because of the fact that symptoms may develop when no history of previous disproportion is present.

Interval Between Pregnancies

Woodbury (1925) found the mortality of infants whose mothers became again pregnant during the infant's first year of life to be over two and one-half times the average rate during corresponding months for all infants. However, the type of feeding, and the nationality of the parents influenced these rates greatly. Hughes (1923) found that in Gary, Indiana, the highest mortality rate was among babies born within 15 months of their mother's previous confinement. For all mothers the rate was 169.1, higher than that of first births, and when the interval was 24 months or over, the rate fell to 102.8. This same condition held for foreign-born white mothers.

One pregnancy following another in rapid succession may not give the mother a chance to regain the necessary vitality to produce a healthy offspring. Aside from this factor there is the important fact that women who become pregnant soon after their last delivery belong as a whole to the lower economic classes of society, which has a bearing, even though indirectly, on the infant mortality rates.

Physical Condition of Mother

It would be natural to suppose that the physical condition of the mother would from *a priori* considerations exert some influence on the health of the child at birth. Proper nourishment and rest, especially cessation from work, has been shown to ameliorate the rates of infant mortality. But there are more direct relationships. Many communicable diseases are carried from the mother to the child before and after birth. Intra-uterine infections have been recorded for small-pox, scarlet fever, measles, cholera, typhoid, and erysipelas. (Williams, 1923). The effect of diabetes on pregnancy has received much attention. Randall and Rynearson (1936) give a good bibliography in their paper. These writers show that babies of diabetic mothers are large and suffer from difficult labor. Hypoglycemia may also be a cause of death in these cases. In Couvelaire's (1923) experience, of 61 offspring born alive of tuberculous mothers, 23 died within 30 days. He could find no demonstrable pathologic lesions and concluded that the infants had been born with diminished vitality. In 1926 Calmette, Valtis, and Lacomme found that the tubercular *virus* passed directly from the mother to the fetus. Couvelaire (1926) then suggested that this might be the cause of the diminished vitality of these offspring. He definitely did not state, however, that the infant is born with tuberculosis. He then went on to show the beneficial effects of separating these infants from their mothers and how the risk of dying was greatly diminished under adequate care and supervision. Although placental transmission of tuberculosis is still a doubtful question, there is no doubt that the separation of the offspring from the tubercular mother is of great value. These diseases are not only dangerous because of the infant's acquiring the causative organism, but also because they lead to other complications of pregnancy that may prove fatal. However, the incidence of these diseases in pregnant women, so far as a cause of death for the child is concerned, is relatively slight.

Syphilis is one disease, though, that cannot be overlooked. Many studies show that this infection plays havoc in the mortality of infants. The first pregnancy of a mother after a syphilitic infection ends as a rule in early miscarriage. In the later pregnancies the child may be born alive with the lesions of syphilis and die young.

In still later pregnancies the offspring may survive and may even show no sign of the disease at first, but pretty surely in childhood and adolescence or even in later life the stigmata of the disease appear somewhere. Williams (1915) showed that syphilis is one of the greatest causes of fetal death. In a later study (1920) his figures showed a percentage as high as 34.44 for infants dying during and after labor because of lues. This percentage was based on 302 deaths in 4000 consecutive deliveries. One half of the colored deaths were due to syphilis. In whites, dystocia was the greatest cause of death but syphilis was close behind. Jeans (1918) found that 75 percent of all offspring in a syphilitic family were infected. In luetic families 30 percent of pregnancies terminate in death at or before term. Thirty percent of all living births in a syphilitic family die in infancy as compared to the normal rate of 15 percent. Only 17 percent of all pregnancies in syphilitic families result in living non-syphilitic children which survive the period of infancy. These figures appear rather high. Pye-Smith (1931) showed that syphilis was not important as a cause of abortions (before 28 weeks) but as a cause of stillbirths and infant deaths. Cruickshank (1924) believed that congenital syphilis is not so common in new-born as some investigators indicate, but it nevertheless is sufficiently great to justify every effort made to deal with it. This conclusion is based on the findings that a positive Wassermann reaction in the new-born infant is of little or no value in diagnosis. The diagnosis can only be made definitely after a careful review of the clinical, serological, and pathological findings. McCord (1927), however, was able to place great reliability on the Wassermann reaction for diagnosis of syphilis in the new-born. The incidence of syphilis and its fatality may be over-rated in some statistics but it is sufficiently prevalent to be considered seriously in combatting infant deaths. Couvelaire (1929) attributed the decrease in fetal mortality in his experience to prenatal care with prophylaxis against syphilis. Klaften (1931) showed that proper prophylaxis can greatly reduce congenital syphilis with a consequent decrease in stillbirths and infant deaths.

There are many diseases associated with environmental peculiarities of certain regions of the world. Thus Wickramasuriya (1938) showed that in 1000 consecutive cases of stillbirths in Ceylon, the majority (66.9 percent) were antenatal deaths resulting from ma-

ternal conditions. Three hundred twenty-five were caused by ankylostomiasis (and associated conditions of anemia), 132 by malaria, 72 died as a result of eclampsia, 53 as a result of pre-eclampsia, and 35 deaths were caused by syphilis.

Hipsley (1926) expressed the view that more infant lives are lost from maternal diseases than from complications of labor. Most studies on maternal complications of pregnancy have been undertaken to determine the cause of death of the fetus in utero but it has also been shown that these complications may exert their influence long after parturition.

Adair and Potter's (1939) figures showed that in 52.6 percent of the stillbirths there were no demonstrable pathologic lesions. However, half (48 percent) of these cases were associated with maternal complications of which toxemia and hemorrhage from placenta previa or premature separation were commonest.

Dieckmann and Brown (1938) restricted toxemia of pregnancy to conditions characterized by hypertension, edema, proteinuria, and convulsions. They found that toxemia did result in smaller babies; 11 percent of all toxemic babies weighed less than 2000 grams, and 44 percent weighed less than 3000 grams. Dippel (1934) found that age of mother had no influence on death in utero, but that there was an increase with multiparity. Causes of death, in order named, were syphilis, toxemia, looping of cord, intercurrent maternal disease, violence to abdomen, induction of labor, hemorrhage, fetal anomalies, knots in cord, etc. Tillman and Watson (1935) give the following figures on the influence of toxemia on premature births:

Type of toxemia	No. cases	Cases prematurity	Per cent
Hypertension			
Mild	338	5	1.5
Moderate	197	9	4.5
Severe	50	5	10.0
With late albuminuria	27	12	44.4
Nephritis			
Mild	121	17	14.0
Moderate	130	33	25.4
Severe	71	26	36.6
Pre-eclampsia	29	7	24.1
Eclampsia	63	9	14.3
Nephritis or pre-eclampsia	10	3	30.0

Dorman (1909) gives the following causes of death of the viable fetus before labor: out of 229 total cases of death, 62 unexplained, 48 syphilis, 47 albuminuria, eclampsia, toxemia, 17 twisted cord, 14 accidental hemorrhage, 9 placenta previa, 6 malaria, 4 fetal ascites, 4 hydramnios, 4 fibroids, etc. Carr and Hamilton (1933) reported that out of 500 women with cardiac disease, 416 viable babies were produced with a fetal mortality of 18 percent. The fetal mortality in the whole hospital clinic was only 1.3 percent. Davis and Harrar (1926) showed that a reduction in the incidence of toxemia and eclampsia, with lowered maternal and infant mortality, can be accomplished with adequate prenatal care, and more conservative treatments of these complications.

If the pregnant woman could have the correct nourishment, good ante-natal care with rest, and if she were also free of any puerperal complications, then the new-born would issue into the world with a better chance of successfully surviving the dangerous neonatal period. But even with the best of care under the guidance of an expert obstetrician there are bound to occur some circumstances that cannot be forseen. The process of being born is a dangerous one and birth traumas account for a large part of the causes of death of the new-born.

Pankow (1930) reported on the high mortality caused by injuries at birth. Fischer (1935) found that in 668 cases, 34.1 percent of the deaths of the newborn were due to birth trauma. As a result of post-mortem examinations Camerer (1937) found that injuries of birth showed an incidence three times that given in the German statistics.

Abnormalities in the construction of the pelvis will naturally be a cause of difficult labor. Pelvimetry has progressed rapidly; new instruments and new measuring techniques enable the physician to gauge rather accurately the architecture and dimensions of that important anatomical object, but even under experienced hands mistakes in measuring can occur. Williams (1915) stated that the moderately contracted pelvis was dangerous because of the difficulty in diagnosing and recognising it. In most cases the expectant mother comes for an examination after it is too late for anything helpful to be done. Winckel (1882) showed that of 51 children extracted

by forceps from narrowed pelves, 9 were born dead, and 5 died within the first eight days. Weibel (1932) gave the following figures to show how deaths of infants increased with a decrease in the conjugata vera.

Conjugata vera (cm.)	± 9.5	± 9	± 8.5	± 8	± 7.5
Percentage death of children	4.4	5.5	5.5	11.5	22.2

Peckham and Kuder (1934) found the gross fetal mortality attendant on delivery through the birth canal following prolonged labor in cases of contracted pelvis to be 19.23 percent in a series of 442 cases. The highest mortality was seen in cases of flat pelves, and the lowest in the generally contracted variety (diagonal conjugate diameter 11.5 cm. or less); the rachitic group falling between the two. Almost half the labors had to be terminated by some sort of operative means entailing a mortality rate of 27.17 percent. The mortality was satisfactory if spontaneous delivery occurred.

Methods of delivery and attendant complications account for many deaths. The use of high forceps is especially dangerous, having a mortality of 9.4 as compared to low forceps with 3.5. The same writer (Ploss, 1931) showed that spontaneous deliveries had a third the mortality of operative deliveries. Woodbury (1925) reported that mothers delivered instrumentally had a rate of 120.3, others, 102.1. Bundesen *et al.* (1938) offered evidence that operative procedures, as well as pituitary solutions and analgesics are contributory to neonatal deaths. Adjusted mortality rates in Potter and Adair's (1939) experience were: natural cephalic 1.1 percent, low forceps, 1.3 percent, mid and high forceps 5 percent, breech presentation 7.1 percent, cesarean section 4.1 percent, version and extraction 13.4 percent. Complications due to mechanism of labor were associated with 45.7 percent of all fetal or neonatal deaths. Pritzi (1927) showed the danger of using unclean forceps, and states that perfect septic conditions must be maintained to prevent disastrous results.

Hemorrhages in the newborn are quite frequent. The fragility of the blood vessels and the great changes taking place in the blood and in the circulation in the transition from intra-uterine to extra-uterine life are conditions which predispose to bleeding. Holt and Howland (1922) divide these cases into two groups: (1) Traumatic or accidental hemorrhages which depend upon causes connected with

delivery; (2) spontaneous hemorrhages, or the hemorrhagic diseases of the newly born. The former occur in difficult labors, large babies, and in artificial deliveries, but may also be present after natural labor or normal sized infants.

Ylppö (1919) was one of the early writers to emphasize intracranial hemorrhages as a primary cause of death for infants. This pathological condition has since attracted considerable attention. Schwartz (1922) stated that stillbirths, asphyxia, and atrophy are in most cases due to traumatic brain lesions. He further stated that these lesions are rather frequent in the new-born. Holland (1922) found a torn tentorium in 75 percent of dead fetuses delivered by all classes of breech. This condition was found in 88 percent of dead fetuses as a result of normal breech labor, and in 71 percent of fetuses delivered after podalic version. This tearing was found to be favored by prematurity. Heidler (1928) reported a high incidence of deaths caused by birth trauma and hemorrhages associated with it. In Bernhart's (1935) experience, cerebral hemorrhage caused three times as many deaths as the next greatest single cause. Cerebral hemorrhage was second on O'Connor's (1936) list, causing 15.4 percent of the deaths. Galloway (1936) emphasized the incidence of cerebral hemorrhage. After reviewing European and American autopsy records, he found that in 30 percent of the former and 28 percent of the latter was hemorrhage assigned as the cause of death. In the Evanston Hospital from January 1, 1925 to December 31, 1934, 34.02 percent of the autopsies showed cerebral injuries. 40.6 percent of full-term babies dying at birth showed cerebral hemorrhage. Potter and Adair's (1939) material showed a percentage of 23.4 for live born infants who died in the neonatal period. Hammond (1939) selected a series of autopsies on the basis that first the child was alive when labor began and second, that it possessed no congenital malformation or defects. Of 200 so chosen, 107 were premature and 35 showed intracranial hemorrhage. Of 69 mature infants, 33 died of intracranial hemorrhage. However, Ford (1926) stated that while a large percentage of babies dying at birth, or within the first two weeks, show intracranial hemorrhage at autopsy, in only about one third of the cases is this hemorrhage extensive enough to cause death. Sellheim (1932) and Catel (1932) also believe

that cerebral hemorrhage as a cause of death is greatly overrated. The latter showed that many normal births have evidence of intracranial bleeding. Ehrenfest (1923) concluded that not all intracranial birth lesions cause death or even marked symptoms, and that intracephalic injuries occur with greater frequency than indicated in post-mortem findings. Peller (1930) believed that by autopsies and microscopic examinations the actual cause of death cannot be ascertained. He has stated (1936) that: " Nicht das Hirntrauma, sondern die Fähigkeit der raschen Anpassung an die Milieuänderung (Reife des Atemzentrums) und die Fähigkeit, das Trauma samt den konsekutiven Störungen der Hirnfunktionen zu überwinden, ist ausschlaggebend."

Adair and O'Brien (1924) showed that cause of death changes with time of birth. Most of the antenatal stillbirths died from toxemia of pregnancy, syphilis and unknown causes. Intrapartum stillbirths suffered mostly from severe birth injury while postnatal stillbirths included many major malformations, one-half of these caused by birth trauma. Neonatal (2 weeks) deaths in the early days were mostly caused by birth trauma, but after the fourth day, infections played the dominant role. More recently Toverud (1936) has pointed out that hemorrhage can occur before labor, a fact which he believes indicates that birth trauma is not necessarily the cause. Factors in the infant itself, a result of pathological maternal metabolism may be the cause. Patten and Alpers (1933) believed that many cerebral birth injuries are due to failure of development of the brain and not alone to birth trauma.

Unknown Causes

Unfortunately, in spite of the numerous studies on the pathological causes of death of these infants there remain many cases where the true cause is unknown, even after assuming that the diagnoses made are correct. Prinzing's table shows the great mortality in the *Lebensschwäche* group, and practically all other lists of causes of neonatal mortality have sections for debility, congenital weakness, etc. In fact, Herman (1924) proposed that the terms congenital debility and prematurity be eliminated as a primary cause of death. Debility means nothing, and prematurity cannot be considered a

primary cause. Dunham (1936) pointed out that the causes of death of premature infants are in at least half the cases reported as unknown. Bundesen *et al.* (1937) stated that in the majority of cases no demonstrable pathologic lesions could be found. Potter and Adair (1939) and O'Connor (1936) found this fact to be true for their series. An answer to these results has not been brought forth although numerous surmises have been made. Schlapp (1923) held that a normal chemical balance of the mother is essential for normal offspring. Any offset in this balance, caused by worry, strain, overwork, etc., will cause defective children. Murphy and Bowes (1939) indicate cautiously that dietary deficiencies and associated anemia may be a predisposing factor in causing congenital malformations. Huntington (1929) concluded that " defective germ plasm may exist normally to account for an occasional abortion in perfectly healthy individuals with unimpaired fertility, but more likely to occur when patient is over or undernourished or poisoned from within or without." That there may be some inherent constitutional defect in the developing fetus cannot be disregarded. It is entirely possible that from purely natural biological causes the fertilized ovum is bad from the beginning and that no amount of protection or prenatal care will alter the fact and prevent the fetus' death if it reaches term. Blandau and Young (1939) working on the development of the guinea pig ovum, found an increase in abnormal pregnancies terminating in the death of the embryo consequent with the age of the egg at the time of fertilization. The older the egg the more the abnormal pregnancies. Robinson (1921) has shown that a considerable amount of prenatal death is normal in mammals. When death ensues in these cases, it is hard to discover the cause of death because in these instances the cessation of life was normal and no inflammatory or necrotic areas are evident.

The effect of hormones has also been a recent subject of study. Potter (1938) stated that oral administration of corpus luteum increases the chances of successful termination of pregnancy. The factor in the corpus luteum responsible for these successes is probably different from the factor responsible for structural changes in the endometrium preparatory to pregnancy. This writer also found that the reactions to the Ascheim-Zondek test of apparently healthy

women who habitually abort is definitely weaker than reactions of normal pregnant patients.

In conjunction with the idea of biologically impaired development is the evidence derived from the excess mortality of male children over female. It appears that the male is the weaker sex, either because of unfavorable recessive sex-linked characteristics as Lenz (1923) believes, or else because of a purely constitutional weakness. Holmes and Goff (1923) showed that the sex ratio at death was highest when the infant mortality rates were low, and lowest when the rates were highest. Holmes (1926) further stated that causes of this differential ratio cannot be related to primary and secondary sexual differences. There are exceptional cases, as hernia, when the incidence is very high in males, and gonococcus infections, which from purely anatomical reasons is prevalent in females. As a general rule, however, these sexual characteristics do not account for the high ratio of death in utero, nor why in later months of life, more boys should die from measles, diphtheria, scarlet fever, and other common infectious diseases.

The sex ratio is high at birth and decreases with age except for the second month when it is higher than during the first, as shown by Bakwin (1929). Holmes and Mentzer (1931) showed that this is true only in areas with a low infant mortality rate. This finding was confirmed by Wyllie (1933). When the infant death rate is high both sexes are carried off more or less indiscriminately by the ravages of an unfavorable environment, but when the rate is low, selection picks on the males. However, as Prinzing says, " die Ursachen der grösseren Knabensterblichkeit sind nicht näher bekannt."

The causal nexus is still undetermined. Reduction in infant deaths has been achieved by a control of the environment after the first month of life. Neonatal death rates, on the other hand, have remained practically stationary in spite of increased activity in interested circles. The results of these many investigations point to the idea that the true, or at least close, answer to the problem may lie, not in the field of medicine and obstetrics, but in the realm of biology.

Constitutional and Hereditary Factors

The relationship of constitution to disease in man has been receiving in recent years more and more attention in both biological and medical journals. Any etiological study of the more important pathological disturbances cannot be considered complete without there being taken into consideration the biological makeup of the individual. No two persons are alike, either externally in their outward physical appearances, or internally in their physiological and genetic construction. The manner in which these various individuals react to their environment or the manner that the environment affects them is certainly tied up with their own individual characteristics. Which of these two factors plays a dominant role depends on the philosophy of the interpreter. But as Pearl (1933) has pointed out, the biological view conceives of a pathological process as due to the mutual interactions of both. If a disease has been subjected to intensive study resulting in a fairly clear concept of its cause and prevention, but if this study has been undertaken from the point of view that the victims are essentially alike and therefore need only be exposed to the necessary germ to produce the customary sequelae of symptoms, and if it then becomes evident that some individuals, even though exposed in the same manner to the same germ, fail to alter their normal course of existence, it becomes only natural to consider why some do not and some do, and in what manner these two types differ.

Since a baby when born has already spent nine months inside its mother's uterus, some influences must have been exerted on it during the prolonged intimate relationship. Just what these influences may be are still moot points. They may be genetical or physiological or more probably a combination of both. Macklin (1936) concluded that inherent defects in the determiners for development are responsible for the vast majority of congenital malformations in man.

Pfaundler (1936) found a correlation in infant mortality rates in related sibships which he believes is due to some inherited factor. Gardiner and Yerushalmy (1939) have shown that stillbirths and neonatal deaths run in families. Neonatal mortality and stillbirth rates of infants born to mothers who had had, previously, one or

more infant losses was more than twice that of infants born to mothers who had had previously no such loss.

On the other hand, the anatomical and physiological constitution of the mother may profoundly affect the baby directly during its intra-uterine existence. Gellhorn (1932) has discussed the role of constitution in the fields of obstetrics and gynecology. Certain constitutional types are associated with certain gynecological problems. "Whether or not constitution influences the ordinary disturbances of pregnancy is still undecided. It seems, however, that hyperemesis occurs more frequently in asthenics. Primary inertia, has of course, various causes; yet, it is observed most often in infantilistic and asthenic women who at the same time are refractory to pituitary extracts and other oxytocics."

That body build plays an important role with respect to the reproductive system of the mother is quite apparent. Every obstetrician has as a fundamental part of his training to study closely the architecture of the pelvis. Since the fetal head barely passes through the pelvic opening, abnormalities of the pelvis seriously affect the baby. Recent studies of Greulich, Thoms, and Twaddle (1939), Caldwell, Moloy, and D'Esopo (1934) have made the identification of different patterns or types of pelvic architecture with external or somatologic appearances. Bayer (1939) showed the relation between menstrual disorders and body build. The virile and hypofeminine types were subject to amenorrhea, the hyperfeminine had the menses disturbed in rhythm and flow, while the feminine were essentially normal. Abnormalities of the uterus such as prolapse, retroversion, anteflexion, etc., if severe enough, lead to dystocia. The position of the uterus is in part due to the condition of the viscera, muscles, and other abdominal parts. That the anatomical configuration of the abdomen is related to body build has been shown in several studies (Pende, 1928). Smith (1906) found that hypotonus of the body tissues and displacement of the pelvic organs occurs in asthenics Gellhorn (1932) expressed the view that this laxity may lead to uterine displacements. Von Graff (1933) considered the etiology of prolapse to be largely a constitutional problem, pointing out that in healthy ideally constituted women more than 50 percent never suffer from prolapse, regardless of the number of children borne.

In women with prolapse causing symptoms requiring treatment more than half were asthenic. Nakagawa (1931) concluded that prolapse of the uterus is caused by abnormal constitution and that there is a close relationship between prolapse and tuberculosis. The latter leads to a deterioration of the constitution. Magid (1931) found that certain women show anatomic relations between spine and pelvis at variance with the majority and that the uterus assumes a position which is essential or normal to these types. Vorzimer, Fishberg, Langrock, and Rappaport (1937), in studying the endocrine basis of toxemia of pregnancy, found that the average pregnancy weight of patients that developed toxemia was 21.8 pounds more than that of patients in the normal series. The incidence of obesity in this type was great. A high percentage of women with toxemia had abnormal hair distribution. 65.8 percent of the patients with toxemia had abnormalities of stature as contrasted with 21 percent of the controls. 55 percent of women with toxemia had changes in faces of the acromegaloid type as contrasted with 5 percent of the controls. Reversion to the male primitive type of pelvis appeared in 88 percent among whom giant pelves were unusually frequent.

Summary

The literature on the problem of infant mortality shows that in the postneonatal period, the causes of death are ascertainable, and can in most cases be controlled by adequate medical prevention and treatment. They at least are not a mystery. In the case of neonatal deaths there are many factors which indicate a biological basis for the failure of the babies to survive. Age of mother, parity, multiple births are uncontrollable. Complications of labor may be averted in some instances, and in others are entirely beyond anyone's control. Some causes, such as cerebral hemorrhage, have received considerable attention, only to have the pendulum swing back, and to be replaced by some other symptoms which in turn gain ascendancy. All this merely indicates that the actual causes of neonatal mortality are largely unknown. It may be that the biological factor of constitution, a subject still not adequately explored, may give a clue to the causation of these infant deaths.

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AN ACCOUNT OF THE EARLIEST COLORED GENTLEMEN IN MEDICAL SCIENCE IN THE UNITED STATES *

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Out of the night that covers me,
Black as the pit from pole to pole,
I thank whatever gods may be
For my unconquerable soul.
W. E. HENLEY.

Professor W. E. Burghardt du Bois has recently disclosed one of the turning points in his illustrious career in the following words: "Franz Boas came to Atlanta University where I was teaching history in 1906 and said to a graduating class 'You need not be ashamed of your African past'; and then he recounted the history of the black kingdoms south of the Sahara for a thousand years. I was too astonished to speak. All this I had never heard and I came then and afterwards to realize how the silence and neglect of science can let truth utterly disappear or even be unconsciously distorted" (1). There are those within the range of my voice who have awakened within me a similar curiosity about the struggle of black men in these United States to master the healing art; to them, here and now, I wish gratefully to acknowledge the widening of a cultural horizon, the revelation that there is a past worth reconstructive salvage, the conviction that Art nor Science respects the guilt-edge favor of Color. When Dr. Burton Chance suggested this title I had hoped I might discover some uncatalogued document of forgotten men; but if there be scholarship in this recital, I cannot claim it; and it gains nothing in my telling of it. Though scarcely conceived in any particular instance to be a nomination for the honor roll of Science, yet have I also avoided the mire of mysticism, magic and sorcery. The early medical men of color in this country were not scientists but there were some of exemplary character and

* Read before the Section on Medical History of the College of Physicians of Philadelphia, October 9, 1939.

meritorious lives encouraging to us who feel that hardship anathematizes ambition. It is only at this relatively late date that we have been able to produce scientists to be reckoned with in the best company; indeed, here and there distinguished beyond compare in their chosen fields of study.

Only two medical schools in this country antedate the Declaration of Independence: those of Pennsylvania, founded 1765, and Columbia, 1767; prior to that Americans wishing to take their degree in Medicine had to go abroad. However there were no laws governing practice and by far the greater number of practitioners had come up under the apprentice system, whereby after a variable term of indenture to some reputable physician a man might enter the practice of medicine on his own responsibility. There were more than three thousand of these in the Colonies at the outbreak of the Revolutionary War (2). Some of them held themselves forth to the public as doctors without the testimony of anyone as to their fitness, save their patients, so far as we have record. A runaway Negro named Simon was advertised in the Pennsylvania Gazette in 1740 as able " to bleed and draw teeth, pretending to be a great doctor among his people." Referring in 1797 to a fugitive slave in Charleston, S. C. the *City Gazette and Daily Advertiser* carried this notice: " He passes for a doctor among people of his color and it is supposed practices in that capacity about town."

Blood-letting in those days was a therapeutic panacea of high favor in informed circles although there were those who strongly disapproved of it. Dr. John Kearsley, Jr., vehemently opposed venesection and purging in the treatment of what he called Angina Maligna, or the Putrid and Ulcerous Sore Throat; this condition appears to have been what we now recognize as diphtheria. Somewhat later blood-letting precipitated a bitter controversy between Dr. Benjamin Rush and Dr. William Currie over the treatment of Yellow Fever in the Philadelphia Epidemic of 1797. Each of these men had their adherents in his particular school of practice: Dr. Rush believed in mercurial purging and copious bleeding. Dr. Currie contended that bleeding had a tendency to weaken the patient. This difference of opinion led to very unbecoming conduct by both sides involving name-calling, challenge to duel, law-suits and at least one

instance of personal caning. Parenthetically, in the earlier epidemic of 1793 the unselfish service of the colored people received public thanks from the Mayor of Philadelphia (15).

The *Massachusetts Magazine* published in 1792 the Symptomatology and Treatment for Poisoning by a Negro called Caesar. The rhetoric reflects some learning and the management marks him as a doctor. One recent writer has quoted Dr. Frederick C. Shattuck of the Harvard Medical School as saying: "Let us use suggestion as far as it is necessary to subserve the best interests of our patients; but let us strive without ceasing to separate in our minds mere suggestion from actual drug action." Caesar certainly had no abiding faith in the empiric virtue of plantain and wild horehound for he anticipated Dr. Shattuck's advice by more than a hundred years in these words: "These medicines have no sensible operation, though sometimes they work on the bowels, and give a gentle stool." He left an elaborate preparation of the decoction of these drugs in true Galenic fashion with detailed directions for administration with the diet and drink during the cure, but one wonders from his description what the etiology might have been. "The symptoms attending such as are poisoned are as follows: A pain in the breast, difficulty of breathing, a load at the pit of the stomach, and irregular pulse, burning and violent pains of the viscera above and below the navel, very restless at night, sometimes wandering pains over the whole body, a reaching inclination to vomit, profuse sweats (which prove always serviceable), slimy stools, both when costive and loose, the face of pale and yellow color, sometimes a pain and inflammation of the throat, the appetite is generally weak, and some cannot eat anything; those who have been long poisoned are generally very feeble and weak in their limbs, sometimes spit a great deal, the whole skin peels, and lastly the hair falls off." The writer's impression is that of mercurial poisoning but it is strange that such an acute observer and disciple of Sydenham should have omitted reference to the urine. The agony is certainly clearly drawn and mercury boasts of an antiquity in therapeutics threatened by few drugs. The diet prescribed was quite in keeping with some present day concepts: "During the cure the patient must live on spare diet, and abstain from eating mutton, pork, butter, or any other fat or oil food."

But Caesar was to come to eminence and emolument in the therapy of still another type of poisoning. Buchan in his *Domestic Medicine*, 1799, mentions him as the discoverer of a remedy for the bite of a rattlesnake. In those days before antivenin he must have had signal success, for the General Assembly of South Carolina purchased his freedom in view of the benefits resulting from the discovery and settled upon him a hundred pounds per year.

The first Negro regular physician properly trained according to the standards of the day of whom we have complete record was James Durham, born a slave in Philadelphia in 1762. Not much is known of his forbears or how he learned to read and write, but as a boy he early demonstrated familiarity with sacred literature and was received as a member of the English Church in 1778 (14). He was brought up in the household of Dr. John Kearsley, Jr. a notable physician of the colonial city, in the best master-apprentice manner, learning the principles of pharmacy and therapeutics by the preparation of medicines and having actual contact with patients. The John Kearsleys, Senior and Junior, uncle and nephew, were gentlemen of very high standing in Colonial Medicine. Dr. John Kearsley, Jr. had been a house pupil of his uncle, along with John Bard, Lloyd Zachary, William Shippen, Sr., the brothers Bond and John Redman. Dr. William S. Middleton (12) has written of him: "No record is found of his receiving any portion of his medical education in England; he had established an extensive practice and was universally respected prior to the dark days of the Revolution. In 1766 he joined John Morgan, Clarkson, Bayard, Harris and Glentworth to form the Philadelphia Medical Society, the first organization of its kind in Pennsylvania. His article on the epidemics of Angina Maligna of 1746 and 1760 which appeared in the *Gentlemen's Magazine of London* in 1769 is said to have been the first American medical contribution to a foreign journal." Dr. James Durham could scarcely have had a more auspicious introduction to the practice of physic. From Dr. Kearsley he passed into the hands of Dr. West, surgeon to the Sixteenth British Regiment during the American Revolution, who continued and advanced his training. But the man was finally finished as an educated physician under the tutelage of Dr. Robert Dove of New Orleans who purchased Durham at the

close of the American Revolution. Recognizing the capability of the Negro Dr. Dove grew intensely interested in seeking his uitimate potentialities in cultivated environment practicing a gentleman's profession. Besides Dr. Dove developed a strong personal attachment to the boy and after serving as medical assistant for two years Durham was permitted to work out his freedom on very liberal terms. New Orleans was unique. I know of no city having a more colorful and romantic history. It was a Southern sea-port, situated on the old Spanish trail from San Diego to St. Augustine, founded in 1718. Delightful in climate, young and flourishing in promise, the city grew full of rude cabins of split cypress boards, roofed with the cypress bark, separated by willow copses and weed-grown ponds swarming with reptiles. Sanitation and hygiene were wretched but what matters that in the glory of adventurous abandon blotted out with looseness and liquor. There were monasteries and Capuchin monks; the Ursuline nuns controlled a Convent there; the Jesuit friars cultivated myrtle wax, the orange, the fig, indigo and sugar-cane on a large tract given them by the French governor Bienville. It was a rendezvous for pirates (Jean and Pierre Lafitte's later home-port), privateersmen, slave-runners, opium peddlers, gamblers, seamen, murderers and profligates of all descriptions roamed the streets. There were few women of good character in the colony in the early days; in fact the dearth had become so acute a little earlier that many of the better class of settlers missing their home life desired to leave. It then became imperative that if the settlement was to survive the men must have good wives to make good homes and Bienville had left the colony promising to send back a boat-load of good women as soon as possible. This he did and they were placed under the care of the Ursuline nuns, and that was the beginning of righteous living in New Orleans. The elements have visited their wrath upon the sinful city many times in its history; floods, hurricane, fire, wind and water have played havoc with its fortune. Every country in Europe is represented in its population; in the early days the Spanish, Italian, French were preponderant; every hue and color from jet black to milk-white could be seen. The French, because of the Creole element, who are the descendants of the French and Spanish settlers of Louisiana, feel perfectly at home, speaking their

own language and living among sympathetic surroundings. The immigrant mulattoes, slaves and Creoles from Cuba, Santo Domingo and other West Indian islands had much in common with the Creoles of Louisiana. Many were of French ancestry, they had the same religion, language and political ideas and had met with the same political misfortunes. They were numerically so strong that they dominated the city. Without a single exception, the coming of law and order to frontiers obliterates a record of reckless past not always compensated for in the opinion of this writer. To see a town burn down, a train-wreck carrying the mail, murder at a card game is worthwhile experience, if a secret boyish yearning may be confessed. By Durham's day a thrifty and progressive Negro caste had grown out of this unparalleled miscegenation about New Orleans, the members of which had the privileges and immunities of freemen. The women were remarkable for their beauty and a sparkling social gayety grew up on a cultivated plane, struggling for survival in some parts even today. Into this setting Dr. Dove released James Durham as an accomplished gentleman and qualified physician. He had acquired a liberal education by contact with the most talented people of his time. He had an informative knowledge of Spanish but he spoke French as fluently as English. His knowledge of medicine was thorough and he gave especial attention to the relation of diseases to climate. Dr. Benjamin Rush, first Professor of Chemistry of the University of Pennsylvania Medical School, who had the pleasure of meeting him, said: "I have conversed with him upon most of the acute and epidemic diseases of the country where he lives, and was pleased to find him perfectly acquainted with the modern, simple mode of practice on these diseases. I expected to have suggested some new medicines to him; but he suggested many more to me." Dr. Rush was a pupil of John Redman and a graduate of Edinburgh and it is significant that he was impressed by Durham, who was respected by the best of both races in New Orleans; he enjoyed a tremendous and lucrative practice yielding an income of more than $3,000 per annum at a time when the dollar was worth considerably more than today.

Within the month I have received this letter from the Registrar of the University of Glasgow: James McCune Smith "matriculated

at this University in 1832 and is described as the oldest son of Samuel Smith, a merchant of New York. The dates of his degrees are as follows, B. A. 1835, M. A. 1836, M. D. 1837." He was born in New York City and attended the New York African Free School, established by the New York Manumission Society in 1787. He was attending that school when Lafayette on his last visit to America in 1824, visited the institution which was carrying out the General's idea of preparing the Negro youth to become intelligent and useful citizens. When the General arrived, the principal had the pupils assembled, and a boy eleven years old delivered the welcome address. That boy was James McCune Smith (3). Because he had difficulty matriculating at the leading schools of this country he was educated in classic fashion abroad. In 1837 he returned to New York and entered upon the practice of medicine. He was so successful that he rapidly built up a busy practice, operating at the same time two first-class apothecary shops. As the advantages of wealth yielded more leisure he turned greater attention to charity, racial interests and writing. He could speak and write scientifically as could no other Negro of his time. For years he was the physician to the Colored Orphan Asylum of New York and the only colored officer of that excellent institution. He enjoyed the respect of the best white physicians and men of science in and about New York. In 1843 he was called upon to defend the Negro against the implications of propaganda disseminated by U. S. Senator John C. Calhoun in public debate on several successive evenings, attended by a large and fashionable assemblage of ladies and gentlemen. He chose to rest his case with a treatise on " The Comparative Anatomy and Physiology of the Races " and easily routed his antagonist to the satisfaction of his audience. To further establish his thesis in 1846 he issued a scientific pamphlet entitled " The Influence of Climate on Longevity with especial reference to Life Insurance." By pointing out the error in a faulty statistical method he attracted the attention of some gentlemen who were calling a meeting for the formation of a " Statistical Institute." Dr. Smith was nominated as one of the five men to draught a constitution (5). Nurtured in this auspicious atmosphere of means and cultivation the vigor and diversified talents of the man carried him swiftly to the esteem of his

profession while his wide public interests brought prominence in the affairs of his race. He was well mannered and handsome with an engaging personality (4).

We have no record of more than a dozen Negroes admitted to higher institutions in this country before 1840. No Negro had graduated from a college before 1828 when John B. Russworm received his baccalaureate from Bowdoin (7). Yet in 1840 there were roughly 400,000 free Negroes or 13% of the total Negro population in the United States—some of them in possession of considerable means. In spite of the law to the contrary a few benevolent masters maintained schools for the education of their mulatto children. When that became unpopular they were privately instructed in the South or sent to the North for education. In the state of Louisiana, where many of these mixed breeds were found, their fathers sometimes sent them to Paris to avail themselves of the advantages of the best education of that time (6). But the chief constructive agencies concerned in formulating a definite program for the education of the Negroes were the Colonizationists and Abolitionists. The colonizationists first inaugurated a plan "to prepare colored men to instruct others in science and religion and to fit them for civil offices in Liberia and Hayti." The plan failed however because of unyielding opposition of the free Negroes and abolitionists; they could see no philanthropy in educating persons to prepare for a doom in a deadly climate. The American Colonization Society then adopted the procedure of educating the emigrating Negroes after they settled in Liberia, and for this purpose they founded and incorporated the Liberia College in 1851, restricting their efforts in this country to cases individually considered as to merit and promise. Dr. William Taylor and Dr. John H. Fleet were thus educated in medicine in the District of Columbia. In the same way John V. de Grasse of New York and Thomas J. White of Brooklyn were allowed to complete the medical course at Bowdoin in 1849. Before considering some of the later men Major Martin Robison Delaney, U. S. C. T. 104th Reg., a physician himself having attended courses at Harvard Medical School mentions several medical men but without dates. However since Delaney's book was published in 1852 we know these facts concern the first half of

the 19th century. Dr. Delaney distinguished himself in the Cholera epidemic of 1854 in Pittsburgh; he became a leader of his people, was a man of some cultivation and wrote in a very direct and clear style. He left the following brief notes on his contemporaries: "By 1852 Negroes had taken courses at the Medical School of the University of New York, the Castleton Medical School in Vermont, the Berkshire Medical School, Pittsfield, Mass., the Rush Medical School in Chicago, the Eclectic Medical School of Philadelphia, the Homeopathic College of Cleveland, and the Medical School of Harvard University.

"David Jones Peck, M. D., a graduate of Rush Medical College, is a talented young gentleman who practiced medicine for two years in Philadelphia and left there in 1850.

"James McCrummill of Philadelphia is a skillful surgeon-dentist, and manufacturer of porcelain teeth, having practiced the profession for many years in that city. He is said to be equal to the best in the city, and probably only requires an undivided attention to establish the reality.

"Joseph Wilson, Thomas Kennard and William Nickless are also practicing dentists in the city of Philadelphia. Mr. Kennard is said to be one of the best workmen in the manufacture of artificial teeth and gums, a new discovery and very valuable article, in this most beautiful and highly useful art. He devotes several hours a day to the manufacture of these articles for one of the principle surgeon-dentists of Arch Street.

"Dr. Bias of Philadelphia graduated at the close of the session of 1851-52, in the Eclectic Medical College in that city. The doctor is highly esteemed by the physicians of his system, who continually interchange calls with him. He is also a practical phrenologist—which profession he does not now attend to, giving his undivided attention to the practice of medicine—and has written the pamphlet on that subject, entitled 'Synopsis of Phrenology and the Phrenological Developments, as given by J. J. Gould Bias.' No man perhaps, in the community of Philadelphia, possesses more self will and determination of character than Dr. James Joshua Gould Bias. The sterling trait in his character is that he grasps after originality, and grapples with every difficulty. Such a man must and will succeed in his undertakings; he is entirely self-made.

" Charles Dunbar of New York City, a promising, very intelligent young gentleman, is now in the office of Dr. Childs, and having attended one course of Lectures at Bowdoin Medical School in Maine, will finish next fall and winter, for the practice of his profession.

" Isaac Humphrey Snowden, a promising young gentleman of talents, is now reading medicine under Dr. Clarke, of Boston, and attended the session of the Medical School of Harvard University, of 1850-51.

" Daniel Laing, Jr., a fine intellectual young gentleman of Boston, Massachusetts General Hospital, who attended the course of Lectures at the session of 1850-51, at the Medical School, Harvard University, is now in Paris, to spend two years in the hospitals, and attend the Medical Lectures of that great seat of learning. Mr. Laing, like most medical students, has ever been an admirer and anxious to sit under the teachings of that great master of Surgery, Velpeau.

" Robert B. Leach of Cleveland, Ohio, a very intelligent young gentleman, is a member of the medical class for 1851-52, of the Homeopathic College of that city. Mr. Leach, when graduated will be the first colored homeopathic physician in the United States.

" Dr. John P. Reynolds, has for a number of years been one of the most popular and successful physicians in Vincennes, Indiana. We believe Dr. Reynolds was not of the ' regular ' system, but some twenty-three or four years ago, studied under an ' Indian physician,' after which he practiced very successfully in Zanesville, Ohio, subsequently removing to Vincennes, where he has for the last sixteen years supported an enviable reputation as a physician. We understand Dr. Reynolds has entered into all the scientific improvements of the ' eclectic school ' of medicine, which has come into being in the United States, long since his professional career commenced. His popularity is such that he has been frequently entrusted with public confidence, and on one occasion, in 1838, was appointed by the court, sole executor of a very valuable orphans' estate. The doctor has grown quite wealthy it is said, commanding a considerable influence in the community.

" Dr. Lewis G. Wells was a most talented orator and man of literary qualifications. Residing in Baltimore, Md., he raised himself

high in the estimation of all who knew him. He studied medicine, and was admitted into the Washington Medical College, attending the regular courses, and would have graduated, but for some misunderstanding between himself and the professors, which prevented it. He was a most successful practitioner, and effected more cures during the prevalence of the cholera in 1832 than any other physician in the city. Dr. Wells was also a most successful practical phrenologist, and lectured to large and fashionable houses of the first class ladies and gentlemen of Baltimore. Being a great wit, he kept his audiences in uproars of laughter. Dr. Wells was also an ordained minister of the Gospel, belonging to the White Methodist connection, and was author of several productions, among them, a large Methodist hymn book, containing several fine original poems. Dr. Wells died of cholera, a disease in which he had been so successful in the treatment of others" (5).

Dr. John A. Kenney has left a colorful account of some notable early physicians: "Dr. Peter William Ray was born in the city of New York about 1823. He graduated from Bowdoin College, Maine and was an interne at Massachusetts General Hospital, Boston. (Delaney says he was assistant and dresser to Surgeon Parkman in his ward of the hospital.) His father, Peter Ray, is noted as having served seventy-six consecutive years in one firm. When he died, he was the most trusted and important superintendent of the Lorillard Tobacco Factory, and originated and perfected many of their famous tobacco combinations, and the only one who knew the secret or the way to prepare their famous snuff. When he finished the public school course in New York City, he prepared for college, a Negro physician, Dr. McCune Smith, being one of his tutors. He entered Bowdoin College not only because it was one of the most reputable in the country, but because there was no color prejudice. In the meantime his parents had bought a home in what was then a suburb of Brooklyn—Williamsburg. He established a drug store there; his practice soon became large and lucrative. The success of two Negro physicians in his neighborhood who preceded and were contemporary prepared his own race to receive him with great confidence, and the Germans from all parts of Long Island soon became his devoted patients. He spoke that language fluently. He was especially success-

ful in the diseases of children and in obstetrics. His practice covered so long a period (over fifty years) that he had frequently delivered children of the third generation.

" He was public-spirited. He was a charter member of the Brooklyn Pharmaceutical Association, in fact, suggested its organization and was for many years its treasurer and only colored member. He was generous to young men of his race who aspired to be medical doctors, assisting with money and instruction and influencing others in their favor. He was a member of the Medical Association of the State of New York. He was also a member of the Brooklyn Association of Art and Science.

" From professional emolument and inheritance he was the most wealthy Negro physician—estimated wealth about $300,000.00. He was from childhood a member of the Episcopal Church, St. Phillip's, New York City, and for a number of years a vestryman. At one time he was elected by the Medical Association, State of New York, as one of their delegates to a convention held in Canada. When he returned he was banqueted by the Association, and the newspapers were full of the credit he had reflected upon his profession in the Empire State of America, and not once was it noted that he was a colored man representing white men. He left one child, a daughter, who is the wife of Rev. Owen M. Waller, M. D. of Brooklyn, New York." The New York *Times* recently published an obituary of Dr. Waller who was educated at Oxford University, England, General Theological Seminary in Manhattan and Howard University in Washington.

" Dr. David K. McDonough is a character with a remarkable history. He came from the very depths of abject poverty and obscurity, having been born in the midnight of slavery. Gentleman, he has put us under a lasting debt to him for the increased value which he caused to be put upon the intellectual possibilities of the race in this country. He was selected after some dispute between his master and another slave owner to settle the question as to whether or not the Negro possesses such innate mental capacity as makes him susceptible to a degree of mental cultivation, which was then considered to be a limit within the possibility of white men alone. He was sent raw from the South to Lafayette College, Pennsylvania, when he

did such phenomenal work that, at the end of his course, he graduated third in his class, earning the distinction of Bachelor of Arts, he having been the only Negro in the institution. Soon after his college career his master in compliance with his request in the selection of a profession, placed him under the preceptorship of Dr. John Kearny Rodgers, one of America's most eminent surgeons, then professor of surgery in the University of Columbia, who despite the intense antipathy of the Negro then prevailing, procured for his pupil admission to the lectures at the College of Physicians and Surgeons. After having received his license to practice . . . his preceptor also secured for him an appointment in the New York Eye and Ear Infirmary where he did much excellent work . . . and caused him to be in frequent demand by some of the most eminent practitioners of the city as a valuable consultant." (Paper by Dr. P. A. Johnson, minutes of the National Medical Association, 1905.)

Dr. John H. Fleet, whom I mentioned a moment ago, opened a school in 1836 on New York Avenue, in a school-house which stood nearly on the spot now occupied by the Richards buildings at the corner of N. Y. Ave. and 14th St. It had been previously used for a white school, taught by Mrs. McDaniel and was subsequently again so used. Dr. Fleet was a native of Georgetown and was greatly assisted in his education by the late Judge James Morsell, of that city, who was not only kind to this family, but was always regarded by the colored people of the District as their firm friend and protector. John H. Fleet, with his brothers and sisters, went to the Georgetown Lancasterian School, with the white children, for a long period, in their earlier school days, and subsequently to other white schools. He was also for a time a pupil of Smothers and Prout. He was possessed of a brilliant and strong intellect, inherited from his father, who was a white man of distinguished abilities. He studied medicine in Washington, in the office of Dr. Thomas Henderson, who had resigned as assistant surgeon in the Army, and was a practicing physician of eminence in Washington. He also attended medical lectures at the old Medical college, corner of 10th and E. Sts. It was his intention at that time to go to Liberia, and his professional education was conducted under the auspices of the Colonization Society. This with the influence of Judge Morsell, gave him privi-

leges never extended there to any other colored man. He decided, however, not to go to Liberia, and in 1836 opened his school. He was a refined and polished gentleman, and conceded to be the foremost colored man in culture, in intellectual force, and general influence in the District at that time. His school-house on New York Avenue was burned by an incendiary about 1843, and his flourishing and excellent school was thus ended. For a time he subsequently taught music, in which he was very proficient; but about 1846 he opened a school on School-house Hill, in the Holbrook Military School Building, near the corner of N. St. N. and 23rd St. W., and had a large school there until about 1851, when he relinquished the business, giving his attention, henceforth, exclusively to music, and with eminent success. He died in 1861 (8).

The Medical Department of Howard University was organized by the election of three members of its faculty in the early part of May, 1868, and in the month of September a fourth professorship was filled. In September also, Dr. Alexander T. Augusta a distinguished colored physician of Washington, was elected as Demonstrator of Anatomy. Dr. Augusta was a gentleman of decided abilities and had a splendid training in Medicine. He was a native of Norfolk, Va., free-born, and served his apprenticeship as a barber in that city, subsequently working as a journeyman at his trade. In his boyhood he learned by stealth to read a little, and improved himself, while working at his trade, by additional reading and study. At a later period he read medicine for a time in the office of a respectable physician in Philadelphia, but he could not gain access to the Medical College of that city by reason of his color. He went to California to get money to prosecute his purpose, and was highly successful. On his return he made another effort to find entrance to a medical college, and was disappointed both in Philadelphia and Chicago. He finally went to the University of Toronto, and was cordially welcomed to the Medical College of that very distinguished institution, second to no University in British America, and after some half-dozen years of laborious academic, classical as well as professional study, he received the degree of Bachelor of Medicine, with the full honors of the college. About seven years later, 1870 to be exact, Osler left the Toronto Medical School for McGill because the clinical opportunities

in the Montreal hospitals, which were more open to students, far exceeded those which Toronto then offered. Alexander Augusta and William Osler sat under the same teachers: James Henry Richardson, William R. Beaumont, Edward Mulberry Hodder, Henry H. Wright, W. T. Aikens, Ogden Thorburn, Oldright and James Bovell.

During the War he was a Surgeon in the Army, U. S. C. T. Seventh Regiment and was stationed at Savannah, Ga., in charge of a hospital; he was repeatedly associated in professional relations with medical gentlemen of the first eminence in that city, who treated him with uniform courtesy. They often came to his hospital to observe cases interesting to the profession, and to join with him in uncommon surgical operations.

Dr. Augusta was the only colored gentleman connected with the Medical faculty of Howard University so far as it had yet been organized. It is a suggestive fact that after such struggles to gain access to a Medical school for his own culture, he should thus be called as a teacher in the first school of Medical Science founded for his race in America.

The following is a note I received from the Adjutant General's Office dated September 6, 1939: "The records of this office show that Alexander T. Augusta, born in the State of Virginia, made application for an appointment as Surgeon of United States Volunteers in 1863, at which time he was a resident of Canada. He was examined and found qualified, and was commissioned as Surgeon of the United States Colored Troops September 29, 1863. He was mustered into service October 2, 1863, at Washington, D. C., as Surgeon of the 7th United States Colored Infantry, to serve for three years. Dr. Augusta was assigned to other duties from time to time, including examination of recruits and hospital duties, until November 13, 1866 when he was honorably mustered out of service with the Field, staff and Band of the 7th United States Colored Infantry.

The records also show that Dr. Alexander T. Augusta served under contract as an Acting Assistant Surgeon, United States Army, from November 14, 1866, date of contract, to March 26, 1867, when his contract was annulled by reason of resignation. This contract service was rendered as a civilian, and was not in the military service of the United States.

On July 16, 1867, Dr. Augusta was appointed Lieutenant Colonel by Brevet in the Volunteer Force, Army of the United States, to date from March 13, 1865, for faithful and meritorious services.

An informal report from the office of The Surgeon General of the Army indicates that Dr. Augusta died December 21, 1890."

Charles B. Purvis, a graduate of the Medical College at Western Reserve University in Cleveland, also became a surgeon in the Army and was for a long period connected with the Freedmen's Hospital in Washington. He did more than any other man to develop the Medical School at Howard in its earliest years (10).

John Van Surly de Grasse studied in private schools until 1840, entered the Oneida Institute but left because Latin was not taught there. He enrolled in Clinton Seminary where he remained for two years, then sailed for France in 1843 and studied two years in Aubuk College, Paris. In 1845 he returned to New York and in 1847 spent two years attending the medical lectures at Bowdoin College in Maine. Leaving the institution with honors after having attracted attention by his brilliancy as a scholar, he again went to Europe in May, 1849 and spent considerable time in the hospitals of Paris, where he was assistant and dresser for Velpeau, travelling at intervals through France, England, Italy and Switzerland. He returned to America on the ship " Samuel Fox " in the position of ship's surgeon. Dr. DeGrasse Asst. Surgeon U. S. C. T. 35th Regiment served on the United States Medical Staff during the Civil War and was the first commissioned surgeon of color in the United States Army. He was a member of the Massachusetts Medical Society, and in appreciation of his services was presented with a gold-hilted sword on behalf of the Commonwealth of Massachusetts, by his Excellency John Albion Andrew, War Governor of Massachusetts. The sword, which the writer was permitted to examine, is now in the possession of his grandson, Dr. Edward V. Asbury of Boston. He began practice in 1852 in Boston, and in perusing his account book this summer I came across an entry of medical care to his nephew Edwin Clarence Joseph Turpin Howard who was born in Boston, October 21, 1846. He attended the public schools of Boston, Liberia College in Africa, and was graduated from Harvard Medical School in 1869 in the same class with William James, George B. Shattuck, Chas. P.

Putnam, J. H. McCollum and F. W. Draper. After graduation Dr. Howard immediately entered the practice of medicine in Charleston, S. C. In his own words he was busy beyond his most earnest wish but after three months he collected one dollar, and that from a half-wit. He then came to Philadelphia and took active interest in civic and community affairs joining the staff of Frederick Douglass Memorial Hospital. Distinguished in appearance, gentle in manner and serious in purpose he rapidly built up a sustaining practice and became the acknowledged leader of the younger progressive physicians of Philadelphia. At that time the Frederick Douglass Memorial Hospital was the only Negro hospital in Philadelphia, founded in 1895. Dr. Eugene T. Hinson has written in his History of Mercy Hospital as follows: "The hospital situation, as it affected our group, was in a very unsatisfactory state in the latter years of the last century and the early part of the present. It is true, we were admitted to the wards of the general hospitals freely, but there was a trend toward segregation, which, in later years has become marked. Then too, our young men were graduating in increasing numbers every year from the medical schools, but with only two or three accredited hospitals in this country to provide the necessary practical experience—others denied them because of color prejudice. The same condition confronted our young women desiring to study nursing, albeit, the University of Pennsylvania Hospital had graduated one and the Philadelphia General Hospital, two of our girls. However, the doors seemed to close against them, thereafter." For reason to be shortly stated a group of gentlemen met at the offices of Dr. E. C. Howard on December 5, 1905 for the purpose of organizing another hospital. Dr. Howard addressed the group in these words: "The present hospital, the Frederick Douglass, having assumed the character of a privately managed, narrow, unprogressive institution, fails to meet the objectives for which it was organized, viz., an opportunity for Negro physicians to get the incalculable benefits of hospital practice, which other hospitals had denied them, also to train our girls in nursing, as well as giving our people additional hospital facilities. That it is unprogressive is shown by the fact, that in its ten years of existence there has been no need for an extra bed. Eighteen of the twenty-four Negro physicians practicing here, petitioned the

Board of Managers of the Douglass Hospital, for an opportunity to cooperate with them in broadening the lines and improving the condition of affairs, but the petition was ignored. Hence, the call for the present movement." That was the birth of Mercy Hospital and School for Nurses. Dr. Howard was a member of the district school board, the Philadelphia County and Pennsylvania State Medical Society and American Medical Association. He died May, 1921 of a cardiac ailment.

The History of the Harvard Dental School records the names of two Negro Doctors of Dental Medicine worthy of note as being members of the first two classes graduated by Harvard and the first two Negroes to receive such a degree in this country. Speaking of Nathan Cooley Keep, first Professor of Mechanical Dentistry and First Dean of the Dental School: " He had a highly developed sense of justice, best exemplified by an incident which occurred at the start of the first academic year. A colored dentist, who had applied unsuccessfully to several dental schools for instruction, came to Boston, called upon Dean Keep and asked to be received. Upon Keep's recommendation, the School faculty decided that Harvard University should consider right and justice above expediency, and should know no distinction of nativity or color in admitting students. This man, Robert Tanner Freeman, was the first of his race to receive the dental doctorate, and his name stands among those who graduated in the first class of the School " (11).

Robert Tanner Freeman, D. M. D., Harvard 1869, was born about 1846 in Washington of former slaves from North Carolina. He died June 10, 1873. Incidentally, the conviction of Dr. John White Webster, Ewing Professor of Chemistry at Harvard for the murder of Dr. George Parkman hinged about the testimony of Prof. Keep who identified the dentistry in the mouth of the victim.

George Franklin Grant was the second colored man to be given the dental doctorate in the United States. He was born in Oswego, N. Y. on September 15, 1847. His early education was obtained in the city of his birth and he later worked as an apprentice to a Dr. Smith, a prominent dentist of Oswego. In 1867 he came to Boston, and in the fall of 1868, he entered the Harvard Dental School, from which he was graduated with the degree of D. M. D., 1870. In 1871 he was

appointed Assistant in the department of Mechanical Dentistry, where he served for three years. In 1874 he became Demonstrator of Mechanical Dentistry, and from 1884 to 1889, he was Instructor in the Treatment of Cleft Palate and Cognate Diseases, in which division of dentistry he showed himself to be especially proficient. He was one of the early members of the Harvard Dental Alumni Association and he was elected its president in 1881. He was also a member of the American Academy of Dental Science. Dr. Grant's skill as a dentist gained him a high reputation among the members of the profession, and he numbered among his patients, Dr. Charles W. Eliot, the President of the University. After practicing for many years he died at his farm in Chester, N. H. on August 21, 1910, of cancer of the liver, and was buried from his residence at 108 Charles St., Boston, Mass. (11).

In conclusion, mention must be made of the first and oldest Negro medical society in the world. Prof. Montague Cobb of Washington has recently written the authorized history of the Medico-Chirurgical Society of the District of Columbia, which he says was an outgrowth of the refusal of the Medical Society of the District of Columbia to admit Negro physicians to membership, a refusal challenged in the United States Senate and the American Medical Association, but sustained through various circumventions. " The Medico-Chirurgical Society was organized April 24, 1884 by a small group of white and Negro physicians to secure to colored physicians the advantages of regular meeting for medical improvement. It is to be borne in mind that these white physicians retained their membership in the regular District societies and so had no special incentive to remain affiliated with the mixed association. The memory of the fine spirit of scientific altruism so courageously maintained by them against all the disparagement and ostracism to which they were subject, should be forever cherished by the Medico-Chirurgical Society." The incomplete list of the founders includes Drs. Daniel Smith Lamb, Robert Reyburn, John R. Francis, John Brackett, and Norwood (13).

Two Negro physicians who were rejected twice for membership in the Medical Society of the District of Columbia (white) were Chas. B. Purvis and Alexander T. Augusta of whom you have heard tonight, and although their sympathy was with the Medico-Chirurgi-

cal Society (colored) they never joined, considering such action to be a subscription never to be abrogated once conceded.

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BIBLIOGRAPHY OF THE HISTORY OF MEDICINE IN THE UNITED STATES AND CANADA—1939

The Council of the American Association of the History of Medicine at its Annual Meeting in Atlantic City, on April 30, 1939 appointed a *Committee on Research in the History of American Medicine* and requested it to prepare an annual bibliography of American medical history.

Titles were collected during the year at the Johns Hopkins Institute of the History of Medicine and in the late fall a mimeographed list was sent to the members of the research committee, to the Delegates of the constituent societies and to a number of medical librarians with the request to help in completing the list. The response was excellent and the Committee is particularly indebted to Mrs. Florence A. Cooksley, Miss Janet Doe, Thomas P. Fleming, Dr. Roland Hammond, Dr. Sanford V. Larkey, Morris C. Leikind, Harold Lief, Dr. Arno B. Luckhardt, Miss Florence McRae, W. B. McDaniel, 2nd, Milton I. Roemer, Miss Elizabeth E. Schramm, Miss Anna M. Sexton, Dr. Walter R. Steiner, and Dr. Henry R. Viets.

The Committee is fully aware that the following Bibliography is by no means perfect. It is being printed nevertheless in order to serve as a basis for discussion at the next meeting of the Council.

One major difficulty is how to reach articles published in local medical and in local historical journals. Another point that will have to be discussed is how far obituary articles should be listed. Their number is endless and the death of a prominent physician usually calls forth a flood of obituaries. The classification adopted in this Bibliography is merely tentative and we shall have to decide whether it is advisable to make subdivisions, e. g. to subdivide *Local History* into states. Within the groups articles have been listed according to authors, but in the biographical section it might be more convenient to list them according to the individuals discussed. In some cases references are not complete because the journals were

not available for checking. If only one page number is given, the article is not necessarily confined to this page.

Our readers are invited to draw our attention to gaps. Titles that have been overlooked will be added to next year's Bibliography. Criticism and suggestions are most welcome and will be discussed carefully by the Council in order to improve this Bibliography and to make it a useful instrument of research.

For the *Committee on Research in the History of American Medicine.*

HENRY E. SIGERIST, Chairman.

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NOTES AND COMMENTS

HAGIOLOGICAL HEALING

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A study of more than thirty thousand legends of the saints constitutes a survey relatively sufficient to summarize some of the aspects of miraculous healing for the student of folk-medicine. Much of the material is perfectly familiar; some items are unique. About ninety percent of all the miracles are concerned with the cure of human ills. Most of these miracles are accomplished solely by prayer and the sincere belief in the efficacy and intercession of holy men. Such thaumaturgy is often interesting, but the realm of the comparative folklorist begins when additional variant factors are joined to the simple act of faith. When a holy person cures a leper with a kiss we are concerned with a human as well as a divine factor.[1] Kissing, moreover, has an independent place in other magic. Analogous is the instance when St. Monnu cured St. Mochua by licking him from head to foot.[2]

The efficacy of saliva is reported in a number of cases. St. Severinus cured leprosy with this secretion.[3] The same material mixed with water served a like purpose in the legend of St. Comgallus. In this instance, the saliva ran out of the saint's mouth during a vigil of three days, when, for sheer weariness he could not keep his mouth closed.[4] Other cures reported as the result of the appli-

[1] *Acta Sanctorum* of the Bollandist Society (Antwerp, 1643 ff.), hereafter indicated by *AASS*. See the following: Raynaldus, Feb., II, 375, col. 1; Thomas Aquinus, Mar., I, 700, col. 2; Michelina, June, III, 932, col. 2; Kinga, July, V, 682, col. 1, and 717, col. 1; Radegund, Aug., III, 71, col. 1; John de Monte-Mirabili, Sept., VIII, 222, col. 2; Francis Confessor, Oct., II, 566, col. 2; Seraphinus, Oct., VI, 151, col. 1; Guethenocus and Iacutus, Nov., III, 99, col. 1; and Frideswida, Carl Horstmann, *Nova Legenda Anglie* (Oxford, 1901), I, 460.

[2] Charles Plummer ed., *Vitae Sanctorum Hiberniae* (Oxford, 1910), II, 186.

[3] *AASS*, Feb., II, 549, col. 2.

[4] Plummer, *op. cit.*, II, 8.

cation of oral moisture include deafness,[5] paralysis,[6] headache,[7] infection from poison,[8] blindness,[9] and severed members.[10] St. Raudan spit into some blessed water and sent it to a sick man who was cured by this potion.[11] Mixing spit with dust was another means of healing.[12] And a concoction of saliva and a vine leaf served for expelling serpents from a boy's stomach.[13] Eastern legends have other instances of the saliva potency.[14] St. Donatus applied his power in a different respect. He spit into a dragon's mouth and the dragon died.[15]

Water in which the saint had washed himself served for the alleviation of a great many ills, particularly blindness,[16] fever,[17] and lunacy,[18] but also for a variety of other diseases.[19] The water was applied externally or taken as a potion. Similarly the water [20] or

[5] Clotilde, P. Guérin, *Les Petits Bollandistes* (Paris, 1878), VI, 421; and Lutgardis, *AASS*, June, III, 249, col. 1.

[6] Aidus, J. W. Rees, *Lives of the Cambro British Saints* (London, 1853), p. 249.

[7] Colman, *AASS*, June, II, 27, col. 2.

[8] Maurilius, *Analecta Bollandiana*, XXIII, 235.

[9] Comgallus, *AASS*, May, II, 583, col. 1.

[10] Attale, *Petits Boll.*, III, 342; and John Parmensis, *AASS*, May, V, 180, col. 2.

[11] Plummer, *op. cit.*, II, 243; and Raynerius, *AASS*, June, III, 448, col. 2.

[12] Anianus, E. A. W. Budge, *The Book of the Saints of the Ethiopian Church* (Cambridge, 1928), I, 265; and Mark, *ibid.*, III, 846.

[13] Monegunde, *AASS*, July, I, 314, col. 2.

[14] Budge, *op. cit.*, II, 366, and IV, 1010.

[15] S. Baring-Gould, *The Lives of the Saints* (Edinburgh, 1914), Apr., 373.

[16] *AASS* as follows: Godefrid, Jan., I, 857, col. 2; Bonitus, Jan., I, 1074, col. 2; Amandus, Feb., I, 852, col. 2; Feb., II, 716, col. 2; May, II, 662, col. 1; May, III, 608, col. 1; Ysarnus, Sept., VI, 743, col. 2; and Geraldus, Oct., VI, 317, col. 2. See too, Horstmann, Frideswida, *op. cit.*, I, 459; and Oswald, II, 259, as well as Amand, *Petits Boll.*, II, 345.

[17] *AASS*, Bonitus, Jan., I, 1072, col. 1; Guidonis, Mar., III, 914, col. 2; Tarasia, June, III, 495, col. 2; and Caesarius, Aug., VI, 82, col. 2.

[18] Poppo, *AASS*, Jan., II, 648, col. 1; and William, June, V, 126, col. 2.

[19] Sulpitius, *AASS*, Jan., II, 173, col. 2; Gaudentius, Jan., II, 420, col. 2; Coleta, Mar., I, 555, col. 1; Heribertus, Mar., II, 483, col. 2; Anselm, Mar., II, 655, col. 2; Pontius, Mar. III, 684, col. 1; Bernard, Apr., II, 691, col. 1; Catharine, Apr., III, 955, col. 1; Comgallus, May, II, 588, col. 1; Felix, May, IV, 255, col. 1; Theobaldus, June, V, 597, col. 1; Nicolas, Sept., III, 653, col. 2; Conoganus, Oct., VII, 39, col. 2; Dominic, *Analecta Bollandiana*, I, 287, 300; Arnulph, *ibid.*, VIII, 98; Luca, *ibid.*, XIII, 117; Wlstan, Horstmann, *op. cit.*, II, 525; and Molua, Plummer, *op. cit.*, II, 208.

[20] Milburga, *AASS*, Feb., III, 391, col. 2; Oswald, Feb., III, 756, col. 1;

wine [21] in which the relics were washed proved beneficial. Water from the fountain in which St. Julian's relics were dipped maintained its curative properties.[22] A stone from St. Wenefreda's holy well was efficacious.[23] Holy wells and springs are nearly as numerous as the saints. Nearly always they effect cures without distinction of creeds, but not always as a certain Protestant learned.[24] Some lepers who came to St. Cronan's house, found him praying, and, not wishing to disturb him, they waited outside the door. A heavy shower came up, and the water from the roof poured upon them. this unexpected bath cured them of their disease.[25] Blessed water at all times had divine properties and some surprising cures have been accomplished by its use.[26] Blood from the holy corpse or relics was particularly beneficial.[27] Likewise sacred oil from various sources had healing qualities whether it exuded from the relics,[28] was blessed by the saint,[29] or came from the lamps at his shrine.[30]

Wulfrannus, Mar., III, 159, col. 1; Franca, Apr., III, 394, col. 2; Agilus, Aug., VI, 589, col. 1; Rosalia, Sept., II, 388, col. 1; Elia, Sept., III, 881, col. 2; Guido, Sept., IV, 47, col. 2; Meinulph, Oct., III, 215, col. 2; and Peter of Oxford, *Analecta Bollandiana*, IV, 27.

[21] Bernard, *AASS*, Jan., II, 548, col. 2; Benedict, Mar., III, 351, col. 2; Lewinna, July, V, 620, col. 1; Gandolphus, Sept., V, 710, col. 2; and Peter, Oct., XIII, 89, col. 2.

[22] Julian, *ibid.*, Aug., VI, 175, col. 2.

[23] *Analecta Bollandiana*, VI, 313.

[24] *Ibid.*, VI, 335.

[25] Plummer, *op. cit.*, II, 23. See also Stephan, *AASS*, Sept., I, 574, col. 1; and Yvo, Horstmann, *op. cit.*, II, 89.

[26] John of Reomay, *AASS*, Jan., II, 860, col. 2; Brigida, Feb., I, 159, col. 1; Aldemarius, Mar., III, 490, col. 2; Paul, *Analecta Bollandiana*, XI, 69; Barrus, Plummer, *op. cit.*, I, 69; Odile, *ibid.*, XIII, 16; and Minas, Budge, *op. cit.*, I, 248.

[27] Amandus, *AASS*, Feb. I, 892, col. 1; Rabanus Maurus, Feb., I, 518, col. 2; Agnes, Apr., II, 814, col. 2; Luchesius, Apr., III, 596, col. 2; Wiborada, May, I, 290, col. 2; Henry, June, II, 374, col. 1; John, Aug., III, 513, col. 2; Patricia, Aug., V, 217, col. 2; Nicholas, Sept., III, 678, col. 1; Januarius, Sept., VI, 813, col. 1; John de Meda, Sept., VII, 359, col. 2; Tyrsus, Oct., II, 364, col. 1; and Wenefreda, *Analecta Bollandiana*, VI, 312.

[28] Godefridus, *AASS*, Nov., III, 922, col. 2.

[29] Bonitus, *ibid.*, Jan., I, 1074, col. 2; Majolus May, II, 673, col. 1; and Pardulphus, Oct., III, 426, col. 2.

[30] Angelus, *ibid.*, May, II, 70, col. 1; Felix, May, IV, 240, col. 1; Audomarus. Sept., III, 400, col. 1; Seraphinus, Oct., VI, 151, col. 1; and Paul, *Analecta Bollandiana*, XI, 173.

The milk of the mothers of various saints was particularly valuable for blindness.[31] Wine from the chalice,[32] as well as from the hand of a saint brought about the alleviation of ailments.[33]

Sacred dust and earth served in many instances as the chief elements in cures. Earth from the isle of St. Maudez was good for the bites of venemous creatures.[34] Two men who were suffering from stomach tumors chanced to find St. Moling when he was digging in his field. When the saint was informed of the sufferers' trouble, he told them to eat of the earth which he was turning over. One man was too proud to do so and died. The other followed the holy man's advice and was cured.[35] In other instances earth [36] and dust [37] from the burial places or tombs of the saints were used to relieve a variety of ills. Earth from the burial place of St. Ciaranus calmed a tempestuous sea.[38] Mud from the staff of St. Aedus proved soothing to cattle when wolves had devoured the calves and the cows refused to give milk. When they were sprinkled with a mixture of the mud and water ' dabunt lac suum.' [39]

Grass,[40] and flowers [41] from the graves of the saints were sometimes beneficial. The sacred tree of St. George of Sardina possessed healing qualities.[42] Grapes from a vine planted by St. Ursus were particularly good for diseases.[43] The saints' pastoral staff, used in

[31] Mochoemocus, *AASS,* Mar., II, 281, col. 2; Lactinus, Mar., III, 32, col. 1; Cilinia, Oct., IX, 320, col. 1; and Albeus, Plummer, *op. cit.,* I, 61.

[32] Magnus, *AASS,* Sept., II, 768, col. 1.

[33] Ludovicus, *ibid.,* Oct., V, 328, col. 2; and Anselm, Horstmann, *op. cit.,* I, 54.

[34] A. le Grand, *Les Vies des Saints de la Bretagne Armorique* (Quimper, 1901), 608.

[35] Plummer, *op. cit.,* II, 201-202.

[36] Neot, Horstmann, *op. cit.,* II, 216; and Meinulph, *AASS,* Oct., III, 215, col. 1.

[37] Cunigunda, *AASS,* Mar., I, 279, col. 2; Eudocimus, July, VII, 312, col. 1; Aegidius, May, III, 434, col. 1; Sira, May, IV, 173, col. 2; Arnulph, Aug., III, 255, col. 2; Rose, Aug., V, 1005, col. 2; Bruno, Oct., III, 770, col. 1; Seraphinus, Oct., VI, 152, col. 1; Rogerius, Oct., VII, 74, col. 2; Basendius, Budge, *op. cit.,* IV, 1112.

[38] Plummer, *op. cit.,* I, 216.

[39] *Ibid.,* I, 41.

[40] Gallus, *AASS,* July, I, 108, col. 1.

[41] Cajetanus, *ibid.,* Aug., II, 306, col. 2; Julian, Aug., VI, 187, col. 1; and Claudius, Oct., XIII, 295, col. 1.

[42] *AASS,* Apr., III, 218 col. 1.

[43] P. Toldo, *Studien zur vergleichenden Literaturgeschichte,* VIII, 50.

many miracles, was potent not only in effecting cures,[44] but also for raising dead people.[45]

Blessed bread was another means of attaining health,[46] although in one instance a dog which unwittingly devoured a piece died instantly.[47] Fish sent to sick people by the saints were beneficial.[48] St. Abban cured a dumb man with an apple.[49] Curious is the instance where a celestial light cured blindness.[50] St. Molua cured a dumb girl with his breath.[51]

Relics of all sorts were applied for many kinds of ills. A few typical examples may be mentioned. A book of the saint's life was endowed with his power.[52] A letter from St. Oyend was an effective cure.[53] Apparel [54] and various objects [55] belonging to the saints were treasured for their healing powers. Water and wine into which relics were dipped was a favorite medicine.[56] The shrine of St. Oswald controlled a pestilence.[57] Hair from St. Godric when drunk in water proved beneficial.[58] Shavings from the cross of St. Aedus caused wort to ferment properly.[59] Iron blessed by St. Baitheneus

[44] Aidus, Rees, *op. cit.*, 248; and Colman, Plummer, *op. cit.*, I, 273.

[45] Ursmarus, *AASS*, Apr., II, 561, col. 2; Dunstan, May, VII, 815, col. 2; Bertrand, Oct., VII, 1181, col. 2; and Peter, Oct., VIII, 748, col. 1.

[46] Coleta, *AASS*, Mar., I, 563, col. 1; Adelbertus, Apr., III, 183, col. 1; Bernard, Aug., IV, 311, col. 2; Magnobodus, Oct., VII, 942, col. 2; Cuthbert, Horstmann, *op. cit.*, I, 229; Oswald, *ibid.*, II, 257; Godric, *Surtees Society*, XX, 185-86, 255; Paul, *Petits Boll.*, II, 378.

[47] Marius, *AASS*, Jan., II, 775, col. 1.

[48] Peter, *AASS*, Aug., I, 193, col. 1; and Bernardinus, Sept., VII, 937, col. 1.

[49] Plummer, *op. cit.*, I, 26.

[50] Lutgardis, *AASS*, June, III, 253, col. 2.

[51] Plummer, *op. cit.*, II, 209.

[52] Oswin, *Surtees Society*, VIII, 46-47.

[53] *Petits Boll.*, I, 43.

[54] Apollinaris, *AASS*, Oct., III, 54, col. 2; Peter, Apr., III, 696, col. 2; Hamon, *Analecta Bollandiana*, II, 528; Godric, *Surtees Society*, XX, 256; Germanus, Feb., III, 265, col. 2; Foillanus, Oct., XIII, 420, col. 2; Lugidius, Aug., I, 349, col. 2; and Richard, Horstmann, *op. cit.*, II, 336.

[55] Filibert, *AASS*, Aug., IV, 78, col. 1; Remaclus, Sept., I, 710, col. 2; Richard, Horstmann, *op. cit.*, II, 336; and Oswald, *ibid.*, II, 259.

[56] Benedict, *AASS*, Mar., III, 343, col. 1; 345, col. 1; Magnus, Sept., II, 764, col. 1; Simon, Oct. XII, 431, col. 1; David, Horstmann, *op. cit.*, I, 262; and Eusebius, *Analecta Bollandiana*, II, 372.

[57] Horstmann, *op. cit.*, II, 260.

[58] *Surtees Society*, II, 264; and Vitalis, *Analecta Bollandiana*, I, 378.

[59] Plummer, *op. cit.*, I, 264.

would not wound.[60] Relics of St. Honorina protected horses from wild beasts.[61] Diseases were banned from the region of St. Michael's Mount (Monte Gargano).[62] To the control of the fertility of the soil (rogation rites) the cure of sterility was added by many saints.[63] St. Marcoul bestowed upon his sovereign the power of curing disease by his touch.[64] St. Rictrudis cured a man while he slept.[65]

The kinds and varieties of cures cannot be exhausted in a brief survey. All the major saints and most of the minor ones are accredited with miracles of the healing kind; St. Godric's feats may be considered as typical.[66] A few curious miscellanea may be added for good measure to the commoner instances.[67] Not only men but creatures, too, felt the benefits of the holy men's powers.[68]

[60] *AASS*, June, II, 237, col. 2.

[61] *AASS*, Feb., III, 679, col. 2.

[62] *AASS*, Sept., VIII, 69, col. 1.

[63] Jova, Mar., I, 141, col. 1; Rolende, May, III, 244, col. 2; Isidore, May, III, 521, col. 1; Virginibus, June, III, 124, col. 2; Sergius, Oct., III, 854, col. 1; Ludovicus, Oct., V, 335, col. 1; Lasrianus, Plummer, *op. cit.*, II, 135.

[64] A. le Grand, *op. cit.*, p. 731.

[65] *AASS*, May, III, 96, col. 2.

[66] *Surtees Society*, XX. Two hundred twenty-four cures are recorded as follows: Blindness and cataracts 39; languishing sickness (consumption?) 23; paralysis 47; deaf or dumb or both 27; dropsy and swellings 11; tumors, cancer and fistula 11; epilepsy and vertigo 5; headache 5; fevers 5; heart disorders 9; insanity 13; leprosy 3; gout 2; unspecified pains 18; broken bones 1; wounds 1; constipation 1; pestilence 1; and restored to life 2. For other saints who had large numbers of cures to their credit see: Simon of Lipnica, *AASS*, July, IV, 529-576; Kinga, July, V, 716-783; Ignatius, July, VII, 792 ff.; Jordanus, Aug., II, 210 ff.; Hyacinth, Aug., III, 344-379; Helena, Aug., III, 612 ff.; Louis (king), Aug., V, 616 ff.; Rosalia, Sept., II, 395 ff.; Rosa, Sept., II, 445 ff.; Nicolas Tolentino, Sept., III, 681 ff.; Leontius, Sept., V, 175-248; Peter de Alcantara, Oct., VIII, 783 ff.; Bernard, Oct., XII, 86 ff.; Dorothea, Oct., XIII, 560 ff.; and Leonard, Nov., III, 159 ff.

[67] Angelic cures appear in the legends of Ampelius, *AASS*, May, III, 365, col. 2, and Ammona, Jan., II, 723, col. 1; venereal disease is cured by Bernardinus, Sept., VII, 965, col. 2; vermin are gotten rid of by Andrea Corsini, Jan., II. 1072, col. 2, and Bertholdus, Oct., IX, 413, col. 1; diseased testicles are restored by Benedict, *Analecta Bollandiana*, XIX, 20; a man with a wooden face (?) . . . 'tabulatam faciem,' finds relief, Carthagus, Plummer, *op. cit.*, I, 179; and Ciaramus of Saigir relieved a woman of an unwanted pregnancy, *ibid.*, I, 220-221.

[68] A falcon was cured by Thomas of Cantilupe, *AASS*, Oct., I, 671, col. 1; a cow's sterility by Abban, Oct., XII, 289, col. 2; a horse's broken leg by Finan, Plummer, *op. cit.*, II, 93; swine pestilence by Gerlac, *AASS*, Jan., I, 318, col. 1.

Only a few suggestions of popular remedies are found in the legends. We hear of an 'emplâtres de Cantharides' so strong that it actually took off the flesh.[69] For pains in her chest St. Aude's step-mother prescribed the application of a cream cheese.[70] In St. Lidwina's legend we hear of a plaster for vermin.[71] St. John's wort (?) was used against poison in the legend of Blessed Hugo.[72] Wolfsbane with other ingredients served as an aphrodisiac in the legend of St. Brynach.[73] A flour and milk paste is said to have cured a tumor,[74] and exercise was efficacious for an unspecified illness.[75]

Among the curiosa may be mentioned St. Aedus' transference to himself of a man's headache.[76] St. Molua relieved a woman of the dead foetus which she had carried three years.[77] The case of Jane James mentioned in a late legend of St. Wenefreda is rather hard to explain.[78]

Consult also Gilduin, *Analecta Bollandiana*, I, 173, and Oswin, *Surtees Society*, VIII, 21.

[69] Felix of Nantes, A. le Grand, *op. cit.*, p. 297.

[70] S. Baring-Gould and John Fisher, *The Lives of the British Saints* (London, 1908), I, 186.

[71] *AASS*, Apr., II, 275, col. 2: 'Miscebatur quoque supradictis, in emplastri confectione, crema lactis vel arvina de albis anguillis vel corpore: ex quibus simul mixtis composito emplastro, super ponebantur eidem cineres antiquae carnis bovinae, in furno vel clibano siccatae et in cineres comminutae.'

[72] Horstmann, *op. cit.*, II, 50: 'Vocatur autem herba illa grece yperichon, latine vero herba perforata sine herba sancti Johannis dicta est. Venenum enim specialiter consumere dicitur, sine bibita sine alio modo sumpta. Valet etiam morsui animalis venenosi, si trita et aquis temperata patienti detur in potum.'

[73] Rees, *op. cit.*, p. 7; 'miscet aconita venereisque munimentis formose indusiata.'

[74] Horstmann, *op. cit.*, I, 218: 'coque, inquit, triticeam in lacte farinam et tumorem superunge, et sanaberis.'

[75] Colomban, A. le Grand, *op. cit.*, p. 766: 'Un autre fois que tous ses Religieux de Luxueil étoient malades au lit, excepté les infirmiers, le saint Abbé leur commanda à tous de se lever, d'aller battre du bled dans l'aire; ceux qui obeirent se trouverent gueris le mesme jour, et les desobeissans fuerent travaillez de leur fiévre toute l'année.'

[76] Plummer, *op. cit.*, I, 38-39.

[77] *Ibid.*, II, 210. The legend of Lugidius mentions another woman who was pregnant three years. *AASS*, Aug., I, 343, col. 2.

[78] *Analecta Bollandiana*, VI, 328: "All the time of her being bed-rid, she had not one stoole, but would often breake wind upwards so very lowde that the noise thereof might be heard to the top of the hill on the side whereof theire house stands, as if it had been a thunder; yet no evill sent was perceaved to come from her body, but a most abhominable foule stench from the furthermost corner of the chimney in the same room."

THE PSYCHOLOGY OF SHYLOCK

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Claude Dariot's *Iudgement of the Starres* appeared in Wither's English translation in 1583 and again in 1598. It was a recognized standard work on the interlocking pseudo-sciences of astrology, alchemy, medicine, and so incidentally psychology; and it generally followed the Greek tradition, derived through Arabic and Mediæval transmission, that associated these studies, part for part, with one another. Men under the astral influence of Saturn, for example, who were thought therefore to be cold and dry and to suffer from the manic-depressive tendencies of "melancholy," it briefly describes as follows:

> He signifieth ould men, fathers, grandfathers, and such like, husbandmen, beggers, Iewes, Moores, digers for metals or stones, potters Curriers, sinkclensers, & all such base trades, obstinate in opinion, laborious, of deepe cogitation couetous, enuious, solitarie, mournfull, few woords, rauenous, deceiuers, superstitious, treasorers, deepe memorie, experience, and knowledge of many things, possessions, buildings, tillage, inheritances, it causeth imprisonments, and secret enemies.[1]

This description covers Shylock's every major trait of character and every major activity in the play: a father, a Jew, a follower of the base trade of usury, rich in "possessions," "couetous, enuious," a deceiver of Antonio and "obstinate" in hating him; and thus his devious and intractable humor "causeth imprisonments and secret enemies." Despite all this, the present writer holds no brief for the particular influence of Dariot's popular treatise on Shakespeare's comedy; for these were the traits that contemporary writers regularly attributed to the atrabilious type. Lemnius, for example, though he does not specifically mention Jews, gives a very similar list for those afflicted from "natural melancholy":

> . . . churlish, whyning, wayward and ill to please, stubborne, intractable, obstinate, greedy of worldly goods, & couetous of money, pinching and

[1] Dariot, *Iudgement*, ed. 1598, sig. D 2 r.

sparing, whē they haue got it, & and not daringe to spēd or bestow upon thē-selues such thinges, as the necessity of mās life for use requyreth.[2]

He adds that they have "slow pace," downcast eyes, "grim" looks and few words. Obviously, an enquiry into the psychology of Shylock must start with a survey of his actions and character in relation to the recognized melancholic type.

Shylock is melancholy in his social aspects as a father, a usurer and a Jew; but he is even more melancholy in his anti-social aspects as an alien and an outcast of society. Melancholy people were thought to be reserved and unattractive, if not actually disliked. Lemnius and Dariot both call them taciturn; Walkington imputes to them great extremes, and says that they are either devils or angels, and that this humor is the "greatest enemy to life." [3] Lemnius calls them "churlish . . . and ill to please"; and no wonder that such were found to be "solitarie." [4] Certainly, Shylock with his "sober" house [5] and his dislike of masques [6] was a social pariah in the festive society of sixteenth century Venice; and no one in the play has a good word for him. He is "The villain Jew" and "The dog Jew," [7] even before he has committed any overt act against Antonio; and later the Doge himself though bound by law to protect him, calls him "a stony adversary, an inhuman wretch Uncapable of pity." [8] His very daughter declares that his house is "hell" and that she is "ashamed" to be his child; [9] and his servant Gobbo loathes him, calls him "the very devil incarnal," and wants him given "a halter." [10] Gobbo claims that Shylock has done him "wrong"; [11] and this wrong, if not imaginary, apparently pertains to food and clothing; for Shylock complains that Gobbo is too "huge" an eater to keep,[12] and Gobbo leaves his service to enjoy the fine new liveries of Bassanio: [13] all this accords with Lemnius' description of the

[2] L. Lemnius, *Touchstone of Complexions*, tr. T. Newton, London, 1576, leaf 146 r.
[3] [T. Walkington], *Optick Glasse of Hvmors*, London, 1639, 125-126.
[4] Dariot, *loc. cit.*; and A. Laurentius, *Discourse of the Preservation of the Sight*, tr. Svrphlet, London, 1599, 82.
[5] *The Merchant*, ed. Aldis Wright, II, v, 35.
[6] *Ibid.*, II, iii, 4; and II, v, 27 *et seq.*
[7] *Ibid.*, II, viii, 4 and 14.
[8] *Ibid.*, IV, i, 4 *et seq.*
[9] *Ibid.*, II, iii, 2 and 17.
[10] *Ibid.*, II, ii, 1 *passim*.
[11] *Ibid.*, II, ii, 121.
[12] *Ibid.*, II, ii, 97; II, v, 3-4 and 45.
[13] *Ibid.*, II, ii, 100.

melancholy type as, even when rich, " pinching and sparing " in their habits.

Perhaps Shylock's most fundamental melancholy trait, however, is his rapacity as a usurer; and, if his bitter ravings truly reflect his inmost soul, he cares more for his ducats and his jewels than he does even for his daughter.[14] Antonio for years has been foiling Shylock's covetous extortions by loaning money without interest; [15] and, when the comedy opens, Shylock has long nursed a bitter enmity against him. Melancholy was thought to be an acrid humor; and melancholy men were especially susceptible to resentment: [16] indeed, Elyot imputes to them " Anger long and frettyng " [17] such as Shylock's. Laurentius thought that melancholy might make a man act like one possessed; [18] and Lemnius declared melancholy men prone to " enuy, emulation, bitternesse, hatred, spight, sorcery, fraude, subtlety, deciepte, treason, sorrow, heauinesse, desperation, distrust and last of all to a lamẽtable and shamefull end." [19] Thus from melancholy covetousness arose a bitter melancholy hatred, and this combined with the further melancholy characteristic of deceit, made this type of melancholic man " a brocher of dangerous Matchiavellisme, an inventor of stratagems." [20] Thus Shylock dissembles and fawns on Antonio while he plots against him; he lies and pretends to be calculating his wealth while he is really gloating at getting him in his power; [21] he even whines, " I would be friends with you, and have your love." [22] Antonio is still suspicious, but he has to sign the bond.[23] Indeed, this early crucial scene between the two is built on Shylock's hatred and deceit, sprung from his usurous rapacity, and sharply contrasting with the open probity of Antonio. Shylock's hatred, once fixed, would be tenacious; for the melancholic temper was " stubborne, intractable, obstinate "; [24] and neither the Doge nor Portia's famous plea can move Shylock to compassion.

[14] *Ibid.*, II, viii, 15 *et seq.*
[15] *Ibid.*, III, iii, 21 *et seq.*
[16] See *NED.*, *s. v.*
[17] T. Elyot, *Castell of Helth*, London, 1541, leaf 3 r.
[18] Laurentius, *op. cit.*, 98.
[19] Lemnius, *op. cit.*, leaf 23 v.
[20] Walkington, *op. cit.*, 129.
[21] *Merchant*, I, iii, 48 *et seq.*
[22] *Ibid.*, I, iii, 133.
[23] *Ibid.*, I, iii, 94.
[24] Dariot, *op. cit.*, sig. D 2 r; and Lemnius, *op. cit.*, leaf 146 r.

The Elizabethans in the scheme of the pseudo-sciences that they had inherited, linked certain temperaments and facial and physical types of men, with certain animals.[25] Shylock is called a dog and a "cur";[26] and probably this is a mere term of general opprobrium;[27] but the repeated references to him as a wolf and "wolfish"[28] would seem to refer to the widespread contemporary belief that made the wolf a symbol of deceit.[29] Thus Shakespeare, both by realistic depiction of his words and deeds and by a traditional symbol accepted in the science of the age, represents Shylock as evil and dangerous, a very pitfall to the upright and unwary.

The cold, dry temperament of Shylock's melancholy, through years of smoldering hate, has become the hot, dry temperament of hidden choler. Lemnius describes this inner burning as the most dangerous of the numerous varieties of melancholy. It is "unnatural," i. e. not innate; it "is compact and made of yealowe or yolkie Choler aduste. . . . If it be immoderatelye and too much enflamed, it bringeth the mynde into furious fitts, phrenticke rages, and brainsicke madnesse."[30] Doubtless, Shylock's unhappy status in the community[31] and also Antonio's contempt, expressed so clearly when they first appear together[32] had greatly aggravated this dangerous humor; for choler was thought to be especially "inflamed by the contempt and bad opinion of others."[33] His memory treasures every insult that Antonio has given him.[34] His combined humors express themselves even in his dream of "money-bags." He took this as a fearful premonition;[35] and "dreadful dreames" were believed to be a

[25] See Lemnius, *op. cit.*, leaf 96 v *et seq.*; T. Hyll, *Art of Phisiognomie*, appended to his *Contemplation of Mankind*, ed. 1571; *The Most Excellent Book of the famous Doctor Arcandam*, London, 1592; and G. B. Porta, *De Humana Physiognomonia*, 1586.

[26] *Merchant*, II, viii, 14; and III, iii, 18-19.

[27] The dog was a flatterer according to Hyll, *op. cit.*, leaf 125 r.

[28] *Merchant*, IV, i, 73 *passim*.

[29] Hyll, *op. cit.*, leaf 121 r; and Arcandam, *op. cit.*, see appended parallel columns.

[30] Lemnius, *op. cit.*, leaf 147 r.

[31] J. Downame, *Spiritual Physicke*, London, 1600, leaves 25 and 26; and T. W[right], *Passions of the Minde*, London, 1606, 308.

[32] *Merchant*, I, iii, 125 *et seq.*

[33] N. Coeffeteau, *Table of Humane Passions*, London, 1621, 559-60, 568, 576.

[34] *Merchant*, I, iii, 101 *et seq.*

[35] *Ibid.*, II, v, 16 *et seq.*

sign of melancholy [36] and even more of choler.[37] Shylock's melancholy, in short, which belonged to him as an elderly father, as a usurer and as a Jew, by degrees was passing into a venemous choler like Iago's; [38] he hardened his heart in evil; and only a power that could break his heart could change him. Such is the Shylock that the initial scenes unfolded to Shakespeare's audience.

Shylock realized his condition; and, in time, it was borne in on those about him. He tells the Doge that it is his " humor " to take Antonio's flesh; [39] and the Elizabethans did not use such well known scientific terms unmeaningly. He declares in evidence before the court that he has no reason to demand his bond except " a lodged hate "; [40] and, indeed, his melancholy, because of the loss of Jessica and his other misfortunes, has so completely turned to choler that the very avarice from which this hate originally sprang is quite submerged, and he refuses twelve times the original loan.[41] This refusal, so important in proving his " malice " against a Venetian citizen and thus in establishing Portia's case against him, seems at first glance an inconsistency in the covetous nature of a confirmed usurer; but the change in his humor from melancholy to choler explains it; and choler is doubtless the " humor " that he mentions to the Doge as actuating his revenge. Indeed, his entire purpose has become to " plague " and " torture " Antonio; [42] and " plague " was no mild word to the Elizabethans. His victim early comes to realize this metamorphosis in his nature, and calls him " cruel " [43] and a " bloody creditor," [44] and refers to his " envy " [45] (?enmity) and his " fury," [46] as if he were quite beside himself; and indeed Shylock has almost lost his reason. The Doge, likewise, and Gratiano comment on his untoward bitterness."[47]

Even as early as the second act, his suspicious nature expresses

[36] Elyot, *op. cit.*, leaf 3 r.

[37] *Batman upon Bartholome*, London, 1582, leaf 32 r; Lemnius, *op. cit.*, leaves 131 v-132 r; Laurentius, *op. cit.*, 82; Nashe, *Works*, ed. Mc Kerrow, I, 353 *et seq.*

[38] See the present author, " The Jealousy of Iago," *Neophil.*, XXV, 50 *et seq.*

[39] *Merchant*, IV, i, 43.

[40] *Ibid.*, IV, i, 60.

[41] *Ibid.*, IV, i, 85-87.

[42] *Ibid.*, III, i, 100-101.

[43] *Ibid.*, III, ii, 317.

[44] *Ibid.*, III, iii, 34.

[45] *Ibid.*, IV, i, 10.

[46] *Ibid.*, IV, i, 11.

[47] *Ibid.*, IV, i, 18, 21 and 126.

such a change: he suspects his daughter's talk with Gobbo; he even suspects Bassanio of flattering him;[48] and suspicion was a sign not only of melancholy but of choler. Bright notes among the characteristics of the former, "feare, distrust, doubt,"[49] and he describes such men as "suspicious."[50] Coeffeteau, likewise, found them mistrustful, and compared them to jealous husbands and lovers.[51] Thus not only Shylock's bitterness against Antonio that is evident when first they meet but also his suspicious attitude toward others show that even early in the play the process of "adustion," i. e. burning, was changing his cold, dry melancholy into a hot, dry choler quite in accordance with the pseudo-science of the age.

Such a hatred, maturing over years, could not but culminate in revenge; Huarte describes a dangerous melancholy as appropriate to "blasphemers [Jews?], wily, double, friends of ill-doing; and desirous of revenge";[52] and Coeffeteau dwells repeatedly upon the vindictive nature of choler.[53] Even before the middle of the play, Shylock, with bitter rage, has vowed to have "revenge."[54] For him, "Every offence" is at once transformed to hate; and hate means death to the offender.[55] At the very outset of the play, he cries, "Cursed be my tribe If I forgive him!"[56] Later Jessica declares that she has heard Shylock "swear"

> To Tubal and to Chus his countrymen,
> That he would rather have Antonio's flesh
> Than twenty times the value of the sum
> That he did owe him.[57]

He has an oath in heaven to take the full penalty of his bond,[58] and has sworn it "by our holy Sabbath."[59] He himself tells Portia in the trial scene: "by my soul I swear There is no power in the tongue

[48] *Ibid.*, II, v, 13.
[49] T. Bright, *Treatise of Melancholy*, London, 1613 (*ed. princ.*, 1586), 151 and 249.
[50] *Ibid.*, 122.
[51] Coeffeteau, *op. cit.*, 627-628.
[52] J. Huarte, *Examen de Ingenios*, tr. R. Carew, London, 1604, 147.
[53] Coeffeteau, *op. cit.*, 552, 582 *pass.*
[54] *Merchant*, III, i, 58 *et seq.*
[55] *Ibid.*, IV, i, 66 *et seq.*
[56] *Ibid.*, I, iii, 46-47.
[57] *Ibid.*, III, ii, 286 *et seq.*
[58] *Ibid.*, III, iii, 5; IV, i, 223.
[59] *Ibid.*, IV, i, 36.

of man To alter me." [60] He is so carried away that he can see no wrong in his hate, and exclaims, "My deeds upon my head!" [61] He cannot recant or change; and, when he fails, he is broken.

Shylock was probably born melancholy as a result of his race and religion; or, if not, he would have acquired the humor from his time of life and his profession. His years as a social outcast in Venice and especially his bitter rivalry with Antonio had heated this cold, dry humor to the hot, dry temperament of choler, which was aggravated by his daughter's elopement and her theft of his gold and jewels. This choler made him vindictive and led him to revenge; and his vindictive refusal of Bassanio's proferred gold and refusal of Portia's plea for mercy before all the court gave evidence that his chief object was not merely recovering his loan but killing a Venetian citizen; and, on this charge, Portia defeats him. Thus Portia's procedure in the trial becomes significant; and thus the very comic outcome of the play depends, at least in part, on Shylock's psychological evolution from melancholy and choler to revenge and so to ruin. According to the psychology of the age, each step in this change arose from the preceding; and the whole evolution, as in great tragedy, was not only natural but inevitable. Evolutions of somewhat similar pattern, and likewise based on the science of the time, appear in Iago, whose choleric jealousy led to his fearful vengeance and then to retribution,[62] and also in Coriolanus, who fell from pride to choler and so to revenge and ruin; [63] and perhaps Shylock should be considered a psychological study in preparation for these later protagonists of tragedy. In any case, he ranks with Romeo and Kate the Shrew as a study, early in Shakespeare's career, of psychological change that results from the impress of situation and event on a human soul. With Romeo, the reaction from the melancholy of unrequited love to his natural sanguine temper is necessary before the plot can start; [64] with Kate, her cure

[60] *Ibid.*, IV, i, 235 *et seq.*

[61] *Ibid.*, IV, i, 201.

[62] See the present author, "The Jealousy of Iago," *loc. cit.*; and "'Honest Iago,'" *PMLA.*, XLVI, 724 *et seq.*

[63] See the present author, "Shakespeare's Coriolanus," *West Va. Phil. Studies*, III, 22 *et seq.*

[64] See J. W. Cole, "Romeo and Rosaline," *Neophil.*, XXIV, 285 *et seq.*

from the violence of choler constitutes the plot itself;[65] with Shylock, the change from melancholy to vindictive choler, expressed in his refusal of Bassanio's money, finally resolves the comic complication. Such a Shylock cannot be the sympathetic figure that some critics and actors would portray; for this type of choler was recognized, as in Iago, as a social menace, just as the usurer was recognized in Elizabethan life.[66] Shakespeare hated Shylock for his trade, and so conceived the background of his motives as utterly deceitful and vindictive.

[65] See the present author, "'Kate the Curst,'" *Jour. Nerv. Ment. Dis.*, LXXXIX, 757 *et seq.*

[66] See the present author, "Usury in *The Merchant of Venice*," *MP.*, XXXIII, 37 *et seq.*

MEDICO-HISTORICAL NEWS AND ACTIVITIES

American Association of the History of Medicine

Members are reminded that the *Sixteenth Annual Meeting* of the Association will be held in Atlantic City, N. J., on May 6, 1940. Like last year three sessions will be held, one in the morning, one in the afternoon, and a dinner session.

The *Annual Meeting of the Council* will take place on May 5 at 3 P. M. All members of the Association are invited to attend this meeting in an advisory capacity.

Professor Arturo Castiglioni, formerly of the University of Padua, has been invited to deliver the first *Fielding H. Garrison Lecture*. His subject will be: *A. Cornelius Celsus as a Historian of Medicine.*

The following papers will be presented:

Burton Chance: Richard Bright, Traveller and Artist.

T. G. H. Drake: Wet Nursing in France during the Eighteenth Century.

Robert S. Drews: The Role of the Physician in the Development of Social Thought.

Reuben Friedman: The Emperor's Itch. The Legend Concerning Napoleon's Affliction with Scabies.

Iago Galdston: Humanism and Public Health.

Maurice S. Jacobs: Paul Ehrlich and his Relation to Modern Chemotherapy.

Bruno Meinecke: An Autobiographical Case History of an Ancient Greek Child.

Savas Nittis: Linguistic and Philological Considerations of the ξυγγραφή and the Secrecy Clause in the Hippocratic Oath.

Henry R. Viets: Smollett, the " War of Jenkins' Ear " and an Account of the Expedition to Carthagena, 1743.

B. W. Weinberger: Did Dentistry Evolve from the Barbers and Blacksmiths or from Medicine?

Evening Session

Esmond R. Long: Presidential Address—Weak Lungs on the Santa Fe Trail.

Henry E. Sigerist: Parallels and Differences in the Development of Medicine in South Africa and the United States (with lantern slides and motion pictures).

The definite program will be mailed to all members in April.

CONSTITUENT SOCIETIES

Section on the History of Medicine of the Richmond Academy of Medicine.

The Academy possesses a unique collection of 72 black profile portraits (silhouettes) of early American physicians brought together by Dr. Joseph L. Miller in forty years of collecting. Dr. Miller has described it in a delightful paper: "A Collection of Medical Silhouettes in the Library of the Richmond Academy of Medicine in Richmond, Virginia," *Bulletin of the Medical Library Association*, 1938, Vol. 26, pp. 129-145.

NATIONAL NEWS

Loyola University School of Medicine.

The *Medical Science Club*, an organization of faculty members and graduate students of the School, devoted its February meeting to the subject of "Research in the History of Medicine." Four papers were presented:

Gertrude M. Engbring, *St. Hildegard—Twelfth Century Physician.*

Thesle T. Job, *A Brief Survey of the History of the Cranial Nerves.*

Earl E. Kleinschmidt, *Some Highlights in the History of Public Health.*

Stewart Craig Thomson, *Historical and Literary Musings in the Extrahepatic Biliary Tract.*

Dr. Engbring's paper will be published in this *Bulletin.*

Seventy-fifth Birthday of Edward Kremers.

Professor Edward Kremers, Dean Emeritus of the Department of Pharmacy of the University of Wisconsin celebrated his 75th birthday on February 23. A Testimonial Banquet was tendered to him on April 4 at the "Memorial Union" in Madison and our Association wired its most sincere wishes on the occasion.

Co-author and translator of the classical work Gildemeister-Hoffmann-Kremers, *The Volatile Oils* (1900, 2nd ed., 1913), Professor Kremers is not only the leading researcher and educator in the field of pharmacy, but has done more than anybody in this country to promote studies in the history of pharmacy. He has given the subject a definite place in the curriculum of the student of pharmacy and the University of Wisconsin owes to his efforts an unusually rich collection of journals, books, pamphlets and other materials on the history of pharmacy which has no equal in the field of American pharmacy. It was due to him that the American Pharmaceutical Association at its 50th anniversary meeting in 1902 appointed a historical committee which in 1904 became the historical section of the A. Ph. A. In his usual unselfish manner Prof. Kremers has placed all his historical materials at the disposal of Dr. George Urdang who is preparing a *History of American Pharmacy* that will be published in the near future by Lippincott and Co.

The Squibb Ancient Pharmacy.

In 1932 E. R. Squibb and Sons acquired in Europe and brought to the United States a unique collection of pharmaceutical shelfware, utensils, books, documents, etc. from the 15th to the 19th centuries. The collection is displayed as a permanent exhibit in a specially prepared setting on the 28th floor of the Squibb Building, corner of 58th Street and Fifth Avenue, New York. An excellent catalogue listing and describing 1102 objects, with 1059 illustrations has recently been prepared by a member of our Association, Dr. George Urdang in collaboration with F. W. Nitardy, and has been published by E. R. Squibb and Sons.

EUROPEAN NEWS

Switzerland.

In celebration of the 70th birthday of its founder, Dr. Arnold C. Klebs, the *Swiss Society of the History of Medicine and Science* held a meeting in Nyon on March 17, 1940. Papers were presented by Et. Clouzot (Geneva), Wald. Deonna (Geneva), H. Fischer (Zürich), André Guisan (Lausanne), Bernh. Milt (Zürich), Eugène Olivier (Le Mont), G. Senn (Basel), J. Strohl (Zürich) and G. A. Wehrli (Zürich).

NEWS FROM ASIA

China.

The *National Medical Journal* published a special Medical History Number of 167 pages containing the following papers (all in Chinese):

Fish in Chinese Medicine: B. E. Read.
Explanatory Notes on Local Names of Diseases: Y. H. Yu.
An Autograph of Hsu Ta Chun: K. C. Wong.
The Life and Writings of Lu Wan Chun, and Their Influence on Contemporary Medicine: H. C. Fan.
History of Gastro-intestinal Diseases in China: T. Y. Sung.
The Use of Precious Stones in Ancient Medicine: Peter G. Mar.
History of Tuberculosis in China: T. Lee.
Some Suggestions for Editing Chinese Medical Literature: C. L. Hung.
Brief History of Legal Medicine in China: L. K. Wei.
History of Quarantine Service in China: C. A. Sung, N. Y. Chin.
The Eyebrows: Eugene Chan.
Hippocrates and Hippocratic Collection: G. C. Cumston, translated by D. G. Lai and Z. Z. Chu.
Medical History in the Medical Schools of the United States: Henry E. Sigerist, translated by C. L. May.
Report of Chinese Medical History Society: K. C. Wong.
Constitution of Chinese Medical History Society.
List of Members of Chinese Medical History Society.